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64/128 VIEW

*You know something, Igor?
I think there may be
life in this thing after all.*

Tom Netsel

There's a great scene in the movie *Frankenstein* when things look bleak for Dr. Frankenstein. He and his assistant, Igor, have done their best to create life in the laboratory, but the experiment appears to have failed. The electrical storm has blown itself out, the generators are quiet, and the traveling arcs of electricity have ceased to crackle and spark. The creature lies still on the table. The doctor slumps in despair.

But wait! There's movement on the table. A hand twitches and starts to move. The doctor rushes forward with his stethoscope and listens for a heartbeat. It's there! His creature lives! "It's alive!" Dr. Frankenstein cries ecstatically. "It's alive!"

That movie scene flashed through my mind recently as I examined a new disk publication called Cee-64 Alive! Jack Vander White and Steven Baxter started the enterprise about a year ago, and now it's up and running and producing disks for the 64.

I suppose the Cee-64 Alive! name reminded me of that movie, but the name also indicates that there's still 8-bit life after IBM. If you're like me, you've had enough of this doom and gloom and moaning and groaning about the alleged death of the 64. Well, its CPU is still beating. The "monster" lives, so let's get on with the movie! We've got a lot of computing to do before the peasants burn the mill in the final reel.

Vander White and Baxter believe that, too. Last year they released a demo and five disks of programs and computer art. Later, Gaelyne

Moranec joined the team as disk editor. This year they've issued another double-sided demo disk and expect to release more programs, articles, and graphics for the 64 and 128. "Our plans for 1993 include six issues of Cee-64 Alive!," Moranec says, "and as yet an undetermined number of supplementary Cee-128 Alive! issues."

In addition to original programs, the staff plans to include programs from the past that still have appeal. "In the areas of shareware and public domain alone it would take one person a lifetime to sift through the programs available, and then there are thousands of commercial programs to consider," Moranec says. The staff already has enough material to fill several volumes, but Vander White still encourages program submissions.

"Cee-64 Alive! has survived its first year—a recession year, at that—by starting out small and building slowly," Moranec says. "We're not packaged fancily, but we offer a wealth of information and programs for a very low cost."

You can get a sample disk for \$3. The six disks issued for 1993 in volume 2 cost \$25, and discounts are available for groups that order five disks or more. The five-disk set of volume 1 is still available for \$20.

Subscribers also can access the Cee-64 Alive BBS. It offers more than 26MB of programs. The BBS number is (916) 395-9733. To subscribe, order a demo disk, or request more information, write to Jack Vander White, P.O. Box 232115, Sacramento, California 95823. □

GAZETTE

64/128 VIEW

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Check out Cee-64 Alive! This disk publication offers programs and articles for the 64.
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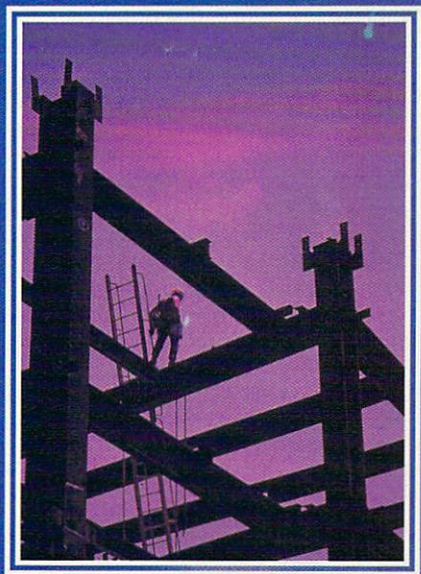
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UPGRADING WITHOUT CHANGING PLATFORMS

By John Elliott

Just because you
want to upgrade doesn't
mean you have to
abandon your present
equipment and
buy a new system.



Are you planning to upgrade your computer system anytime soon? If so, just what do you mean by upgrading? Even people who support the 64 and 128 usually think it means moving to the Amiga or IBM, but it can mean something else as well. You can upgrade your present equipment, making it more flexible and powerful, without buying a whole new system.

It's true that major software developers rarely produce for 8-bit platforms anymore, but that doesn't mean that the platform's been abandoned. It would seem that owners of these computers should consider preserving their hardware and software since replacing them may be expensive.

Some people argue that there's nothing new for the 64 in the way of hardware and that even once-familiar names in the Commodore market are dropping their 8-bit products. So maintaining and enhancing existing equipment can also be difficult.

Schnedler Systems

The story of Schnedler Systems supports the above arguments. Until recently, Schnedler Systems produced accelerator CPUs that boosted the 64's operating speed to better than 4 MHz. It also made adapters that let you use RAM expansion units with these speed-up devices. Schnedler's main Commodore customers were factories in various industries which used 128s to monitor different testing procedures. The additional speed of the accelerator CPU was useful in this process.

"When Commodore stopped making the 128, the factories gradually lost interest in using it for these purposes," says a Schnedler spokesperson. Schnedler has sold out of these devices and has terminated production. The company now primarily makes interfaces and modems for IBMs, although one interface is Commodore compatible.

Efforts to boost the operating speeds of the Commodores have met with little success. For more than a year, there were rumors about new high-speed chips that could accelerate the 128.

Parsec

Through his company, Parsec, Ron Brown commissioned the production of a limited number of 128 boards which operate at from 6 to 12 MHz and carry up to 1MB of RAM on board. Advertising of this and two other new products was limited to his magazine, *Twin Cities 128*, and to bulletin board systems. By November

1992, he had more than 100 advance orders, but that was not enough to pursue production. Partly because of the narrow margin of profitability with this product, Brown was forced to abandon these high-speed boards.

The news is not all bad, however. Brown reacted to the death of *RUN* magazine by expanding *Twin Cities 128* to include 64 coverage.

The Commodore story is far from being over, however. Older products disappear, rumored new ones never make it to market, but there's still plenty to get excited about. Many companies still support the 64/128 by updating their successful older products and by developing new ones.

The FGM Connection

Ron Hackley and Jerry Freadman operate a company whose very popular program, Fun Graphics Machine, manipulates graphics and type in many unique ways. I asked Hackley, the FGM programmer, why he still supports the Commodore platform.

"It's more forgiving and has a smarter DOS than the other machines," he said. "When you turn it on, the DOS is just sitting there. There are few viruses—maybe not any. It's much friendlier to use. For most programs, you need only a couple of sheets of simple instructions. It's for the home user who doesn't need extras."

Like many producers of a single program, Hackley and Freadman don't have a large advertising budget to attract customers. In addition to placing small ads in *Gazette*, they rely on somewhat unorthodox marketing approaches by selling FGM through user groups and electronic bulletin boards.

An FGM upgrade will soon be available that will support RAMLink from Creative Micro Designs (CMD). It will also support Commodore's RAM expansion units, if Commodore will allow a license. The new FGM will import graphics in geoPaint format, Handyscanner creations, and text from most word processors.

The Write Stuff

Eric Lee is the creator of The Write Stuff, a word processor that's generated such loyalty among its users that they've created their own newsletter. With each hardware innovation in the 64/128 market, Lee has adapted his program to take advantage of any additional possibilities. All versions allow use of an REU to save text and to check spelling. There are special versions for the 1581 disk drive, Quick

Brown Box nonvolatile storage cartridges, and Creative Micro Designs' hard drive and RAM units.

Lee has decided to take his word processor to version 3. This version will feature high-resolution printing on Epson-compatible printers by utilizing three passes of the printhead. Each letter, up to 500 dots in height, can range from two inches to microscopic. Printing will be solid at all sizes—no jaggies! Fun Graphic Machine's Ron Hackley has seen sample printouts, and he says they are "near laser quality." A beta version should be circulating by the time this article appears.

At the same time, Lee is compiling a collection of 7000-8000 IBM shareware and public domain images that he is porting to the 64/128. He will sell catalogs of these images that will be indexed by subject. Sales will be largely through user groups. More than 220 of these associations are currently selling his Write Stuff word processor.

Quick Brown Box

Brown Pulliam sells a range of battery-backed cartridges that have storage capacities of from 64K to 256K. Several hundred owners use a model of a Quick Brown Box that contains a specially adapted version of The Write Stuff. The word processor is available instantly, and users can store files in it as well. Many other people use a Box as a substitute disk drive to hold frequently used programs, such as SpeedScript.

Last year, Pulliam ran a contest for database and spreadsheet developers to see who could develop the best version for QBB. Although there were no database submissions, Pulliam did select and now distributes a spreadsheet that not only loads from QBB but also stores the created spreadsheets back to the Box. It was initially released in its non-QBB form as Calc by Pankhurst Programming. Pulliam says that he finds that the spreadsheet especially lends itself to inventory control.

With his relatively low sales volume, Pulliam does not advertise widely, but his products are still available. Word of mouth is a primary method of promotion.

Rio Computers

Rio Computers, which sells a number of Commodore and video-related devices, sells Handyscanner, the only scanner available for the 64/128 in North America. By the spring of 1993 it expects to offer a genlock for the 64 that should sell for around \$400, but

early orders may go for \$300.

Rio also plans to offer a stand-alone video titler in the same price range. While it will begin with titling and mixing, video editing and other modules will eventually be added. The hardware should sell for prices that are comparable to an Amiga's. The market could include small television stations, cable stations, and home hobbyists.

I asked Rio why it produced high-end material for an inexpensive machine. "We love the 64," a spokesman said. "It meets all of our needs. We produce for those who don't want to go to a new machine when new things come out."

Mad Man Software

Gene Barker and his associates have developed an adventure game that they call Messiah III. This multidisk product technically surpasses previous 64 games and challenges those of any platform. Bard's Tale had 70 different pictures, but Messiah III has more than 300, with more than 50 maps of the terrain.

To make this amount of information manageable, they developed a personalized "Mad DOS" that makes the longest wait between pictures 12 seconds. Since Messiah III has been adapted to run from CMD RAM devices, loading is instantaneous. "It's like using CD-ROM," says Barker.

It was also necessary to develop a compression program that doubles the disk capacity to fit the game on a reasonable number of disks. This Master Archiver is available separately for about \$40.

The staff at Mad Man has also written a paper called "How to Keep Your Commodore Alive." This is a collection of tips and suggestions to keep your computer fit and happy.

Barker and friends began work on Messiah in 1986 while at the Colorado School of Mines. They are just about finished. Why spend all this time and effort on an aging machine? "Why drop the 64 when it can challenge the IBM?" Barker answers. He and his coworkers feel that with appropriate planning and programming, the 8-bit Commodores can accomplish anything that other computers can and do it more efficiently.

SOGWAP

Mark Miller is the creator of Big Blue Reader and Bible Search, two programs still on the market for the 64 and 128. He started selling Big Blue Reader for the 128 and 1571 in August 1986. By November 1987, it

Referenced Companies

Creative Micro Designs
P.O. Box 646
East Longmeadow, MA 01028
(800) 638-3263

Rio Computers
3310 Berwyck St.
Las Vegas, NV 89121
(702) 454-0335

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115 Bellmont Rd.
Decatur, IN 46733
(219) 724-3900

The FGM Connection
P.O. Box 2206
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(503) 673-2234

Mad Man Software
The Enterprise Center
1400 E. College Dr.
Cheyenne, WY 82007-3298

Parsec-Twin Cities 64/128
P.O. Box 111
Salem, MA 01970

Pankhurst Programming
P.O. Box 49135
Montreal, QU
Canada H1N 3T6
(514) 727-3596

The Write Stuff
Busy Bee Software
P.O. Box 2959
Lompoc, CA 93438
(805) 736-8184

Quick Brown Box
26 Concord Rd.
Bedford MA 01730
(617) 275-0090

Performance Peripherals
5 Upper Loudon Rd.
Loudonville, NY 12211
(518) 436-0485

generated enough income (modest, he insists) for him to be able to quit his regular job. In 1988, he began to sell a version for the 64. For all these years sales have been consistent. Most of his market has been in North America.

While BBR provides profit, Bible Search barely supports itself. Miller revised it about a year ago. It now prints verses, saves a range of verses to disk more easily, and on the 1581 treats the Old Testament and New

Testament as one section.

BBR version 4 now supports a joystick, and both the 64 and 128 versions recognize subdirectories and RAM expansion units. Both versions are compatible with JiffyDOS.

Over the years, support has been consistent for the 1571 and 1581 versions of BBR. As yet there have been few requests for a version that works with the new floppy drives from CMD.

Creative Micro Designs

CMD has produced more innovative software and hardware for the 64 and 128 than any other company. Its initial success came from JiffyDOS. There are now a million of these DOS wedge and disk accelerator units in use. CMD's RAMLink and RAMDrive cartridges provide nonvolatile RAM expansion units with a proprietary DOS. CMD sells the only hard drive still being marketed for the 64/128. CMD also markets a number of software enhancements for GEOS that make special use of its hardware.

CMD also sells special-purpose cartridges. One contains an extra SID chip that enables the 64 to produce stereo sound. The other is a high-speed RS-232 interface that allows connection to IBM devices.

Most recently, CMD is marketing two high-density FD series drives. The FD-4000 3 1/2-inch drive lets you use enhanced density disks and provides up to 3.2MB of storage. This is more storage capacity than the floppies of most other computer platforms. Its little brother, the FD-2000, allows up to 1.6MB of storage.

The latest version of JiffyDOS is three years old. With the exception of it and the hard drives, all of CMD's products have been either developed or newly marketed in the past two years. This is a heavy commitment to a platform that some say is in decline.

Charlie Christianson Jr., the president of the Massachusetts-based CMD, provided some significant statistics that may explain his company's support for the Commodore computer. "About 800,000 Commodore 64s were sold worldwide in the past 12 months. Eighty percent of these were sold in Germany, where these machines are assembled. The company (Commodore) still supports the C64 in Europe."

While business in Europe is good, over half of the CMD sales are in this country. After Germany and North America, Australia provides a good return in terms of investment. Last year the Australian branch of Commodore sold 30,000 units in a

Commodore sold 30,000 units in a single sale to China.

Christianson says he wants to assure Commodore users that as long as his company's products continue to be successful, they can expect further hardware and software enhancements from CMD.

Performance Peripherals

Peter Fiset, in addition to being a graduate student in computer engineering, is the creator of CMD's RAMDrive. Although his studies are not on Commodores, he continues to develop for the 64/128 because he sees a strong potential market.

In December 1992, he began to ship a battery backup unit (BBU) which allows both geoRAM and Commodore REUs to have nonvolatile memory. Whatever program or data is in the unit when you turn off your computer will be there when you turn it on again. As long as the program doesn't reinitialize the REU each time it's loaded, whatever the program puts in the REU will remain there. The most obvious uses for this product would be for word processors which place text files and spelling checkers in the REU, and, of course, GEOS.

A separate battery backup RAM

disk (BBG RAM) can retain up to 2MB of memory. This device is only for GEOS, but it includes a GEOS application that lets you select one of up to five 1571 drives.

By some estimates there are up to 800,000 Commodore RAM expansion units and geoRAMs on the market. Fiset will be successful if a significant fraction of this population becomes aware of his devices and decides it wants to leave programs or data in its REUs. What BBG RAM will lack in comparison with the CMD units is the ability to access partitions, emulate different Commodore disk drives, and easily convert the device number of the RAM device.

Fiset has a particular market in mind. Aware that in a sense he is competing against his own RAMDrive, Fiset pointed out that "some Commodore users cannot afford the CMD RAM devices but do want nonvolatile memory." Fiset has not done formal market research and will know by his sales whether there is a market for his devices, which start at about \$50.

The Current State of the 64/128

In a recent "64/128 View," editor Tom Netsel complained that his cupboard

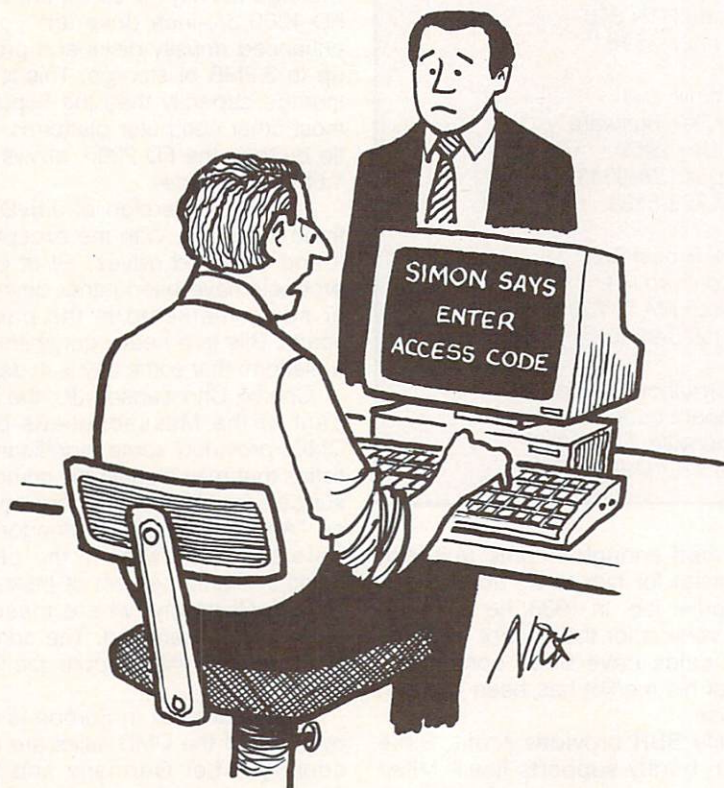
was nearly bare of products to review for Gazette. New products for the IBM were being released at a tremendous rate, but Commodore products had slowed to a trickle and had practically dried up altogether. Was this going to be the end of the 8-bit line?

That's when I decided to check with companies to find out for myself whether or not anything new for the 64 was in the offing. Was there anything coming that could give my system a technological upgrade, or should I resign myself to stick with the hardware that I already have? I expected to hear people say that as long as my Commodore is performing its tasks satisfactorily, then I should be content. After all, only vanity could justify my changing platforms.

Instead, I found that a group of individuals and small companies are stretching our computers in directions undreamed of only a few years ago. Gone are the huge distributors who once flooded the Commodore market with flashy advertisements and jealously guarded their marketing plans. This group is a community of developers. In many cases I received names and phone numbers of companies from people who in any other business would be considered rivals.

Collaboration is evident. The Write Stuff adapts to CMD and Quick Brown Box hardware. The Write Stuff creator sends his letter quality fonts to the developers of Fun Graphics Machine. Messiah III's developers at Mad Man are adapting for the CMD RAM devices and considering further joint projects. It could be argued that some of the products described in this article don't constitute simple upgrades. A cartridge or a new piece of software may not seem like much, yet each product makes the 64 or 128 do something it couldn't do before. The more substantial pieces of hardware from Rio or CMD can certainly broaden your computing horizons, and you don't have to be a computer engineer to use or install them.

Upgrading by using the products described here seems to me to be a better idea than switching computer platforms. It's an especially strong argument when you consider the time, effort, and money you probably have invested in your Commodore system. There's another reassuring note when you examine the other end of the Commodore pipeline. The investment of time, energy, and money by the software and hardware developers is an indication of their conviction that our Commodore computers will be productively used and enhanced by



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DR. SPELLINGSTEIN

Things are different in Australia. Stargazers seek the Southern Cross, not the Big Dipper. Those wanting to be alone with their thoughts go on *walkabout*, not *retreat*. And Australian schools use Commodore 64s—hence Free Spirit's import from the "Minister of Education for and on behalf of the Crown in right of the State of South Australia." Meet Dr. Spellingstein, the monster spelling program for the 64.

Dr. Spellingstein is a drill-and-practice program designed to reinforce words already taught in the classroom. It does this via three different games: Flash Words, Jumbled Words, or Guess the Word. Players who answer all game questions correctly earn the chance to build their own monsters in the laboratory via Monster Mix and Match.

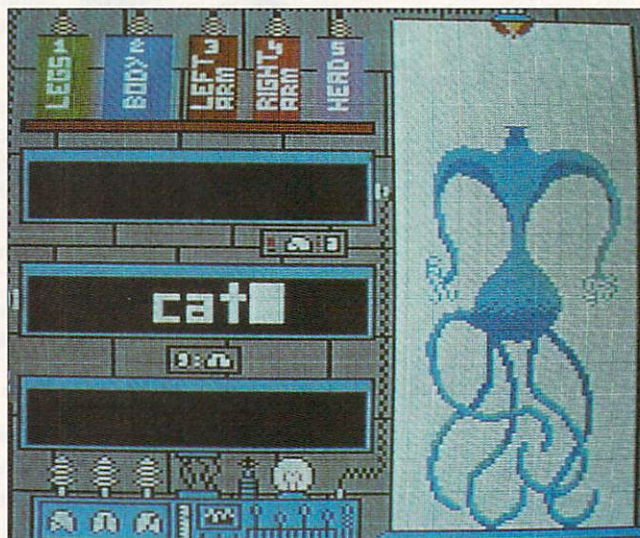
There are two ways to use Dr. Spellingstein. The first is to play what the manual refers to as Dr. Spellingstein—Home Version and what the game menu refers to as The Dr.'s Flash Game. This discrepancy illustrates the sole problem with this game: The program menus differ from those illustrated in the manual. Only the section titles are changed, however, and since they're in correct sequence, it's not hard to figure them out.

This first game lets you select a list of six words from 168 lists already on disk. The word list is displayed on the screen for study. When you've finished studying, press Return to begin. At that point, Dr. Spellingstein's laboratory appears, and the first word flashes briefly in the top window. The word

disappears, and a cursor appears in a second window, ready for you to spell the word that just flashed.

Correct answers are sometimes rewarded by the appearance of a monster's body part in the laboratory. By the end of a game, even without getting every answer right, the whole mon-

ster can be assembled. Get all the answers right, however, and you can build your own monster by combining parts from other monsters.



Answer all questions correctly and earn the chance to build your own monsters in the laboratory via Monster Mix and Match.

ster can be assembled. Get all the answers right, however, and you can build your own monster by combining parts from other monsters.

The next option on the menu (School Version in the manual; Your Game and More Games on the screen) lets you play games that you've created with your own word lists. These lists may contain up to 20 words and are saved with their own game parameters. That is, a list saved as KATE1 may be a list of 20 words that we've saved for our daughter Kate to play as Flash Words. KATE2 could be the same list saved as Jumbled Words where you unscramble letters to make your word. KATE3 could be

the same list again for playing Guess the Word, a Hangman-type game. The lists are created with the next module (Word List Editor in the manual; Game Creator onscreen). From here you can change the game setup; edit a word list; print the list; and load, save, or erase games.

The power of the program lies in the parameters within Change Game Setup. This is where you choose one of the three games; how long a word is displayed before it disappears (or in the case of Guess the Word, how many letter guesses you get); whether or not the game is sensitive to entering upper- or lowercase; whether or not the player wins the chance to build a monster; and, finally, whether or not Answers equal Questions.

This last option, at first confusing, actually gives you the ability to devise a quiz. For example, you could enter a math equation such as 10×5 as the question and 50 as the answer, thus cre-

ating a math quiz. There are any number of short questions that could be handled with this option, making this program much more useful than a mere spelling game.

The last module, known as Monster Printer in the manual and Print Saved Monsters onscreen, handles the loading and printing of monsters that the players have created. It also provides a way to delete files to make room for new monsters.

We have always admired programs that allow versatility and creativity in their operation. Dr. Spellingstein has as its primary goal to assist youngsters in learning their spelling words. It approaches this in a challenging and fun way. Yet it also allows you to modify enough facets of the program to put you in control. You determine how hard to make the games, what words to use, and even how the games are played. The possibilities are as endless as the number of monsters you can make with the various parts Dr. Spellingstein provides!

It's easy to see why the Australian school system uses Dr. Spellingstein. It's a program that can be used at home or in a class, and it can be adapted by parent or teacher to suit any student's abilities and needs. It's flexible and powerful, easy to grasp for the student user, and entertaining as well. In fact, Dr. Spellingstein fulfills every requirement we've ever had for an educational program and does so respectably. We highly recommend it.

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REVIEWS

ESCAPE ROUTE

It was a cold night in the city when the chief gave me the job of reviewing this new game from Creative Pixels called Escape Route.

Following his orders, I went undercover as private investigator Eric Hawthorne of the Apex Detective Agency. My job: recover the rare Acme diamond. It seems some dame called the IceLady stole this little trinket. I've got three weeks to catch this frozen Fräulein and recover the rock, and she's got a 4000-mile head start on me. This gumshoe's got no time to waste.

The sleuthing begins with a main menu of seven icons and a picture of the chief, who looks amazingly like Humphrey Bogart. These icons, which are explained in detail in the instructions, are a series of tasks and events that make up the game. These include a piano drop, roulette wheel, expenses, driving, gems, the IceLady's castle, and a flat tire.

When the main menu comes up, a flashing figure of Eric moves quickly from icon to icon. He's moving so fast that you have no real choice of which icon to try. Instead, you must hit the joystick's fire button and take your chances. Just hope that Eric doesn't land on the expenses or flat tire icons, since these cost him time and points.

The piano drop, like the main menu, depends solely on luck and requires no skill. Your only requirement is to move Eric left or right on the screen when he encounters the IceLady. Pick a spot, press the fire button, and wait for the piano to drop, praying it doesn't land on Eric. If Lady Luck is in a good mood, Eric not only avoids being flattened, but he gains 250 miles on the IceLady. On the other hand, if his luck is out to lunch, the IceLady gains 250 miles on Eric.

When an event is over, you return to the icon screen to try another game. Once again you press the fire button and see where Eric lands. At the top of this screen, you'll see the number of days which have passed, the number of miles to go, and the point score.

These extra miles can be whittled down easily, however, if Eric lands on the roulette icon. They can be increased just as quickly if he lands on the expenses icon. When he lands on either of these icons, a screen will come up with a picture of the IceLady, stating how many miles have been lost or gained. With the roulette wheel, which works in the player's favor, you can gain from 1 to 500 miles. The ex-

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penses icon, which works in the IceLady's favor, can add from 1 to 500 miles to her lead over you.

The flat tire screen is similar to the roulette and expenses routines in that it offers no action or player involvement. It consists of a picture of Eric standing next to his car, which has a flat tire. The number of flat tires add up throughout the game. Get four of them, and the caper is over. The number of flat tires is displayed on the main menu screen. Luckily, no mileage penalty is given for a flat tire.

The remaining icons, which consist of the IceLady's castle, driving, and gems, are the most enjoyable aspects in this program since they require some skill and offer you some chance of action. Each task starts with explanatory text and graphics which may be skipped later on.

In the IceLady's castle, Eric must battle against her henchmen who fight ninja-style to keep him from entering her castle. For each henchman that you defeat, you gain 100 miles and receive 150 points. Bars at the bottom of the screen indicate both the strength of Eric and the strength of the ninjas. When Eric's punches land, he experiences a moment of spiritual connection with Bruce Lee!

The driving event seems to have been inspired by Alfred Hitchcock. The challenge comes from avoiding a number of low-flying ducks that head straight for Eric's car. Luckily, you can move the car to avoid the ducks. You can even move it backward. In this event, you can gain up to 500 miles.

Finally, gems is a fairly entertaining segment which closely resembles Pac-Man. Eric is chased by a ghost through a dungeon maze. The objective of this timed event is to pick up as many as possible of the 25 gems strewn about the maze without being caught by the ghost. For each gem you pick up, you gain 20 miles and 50 points.

Each game takes up 1 day of the 21 which you have to solve the case, so landing on the expenses icon or getting hit by the piano too often can make it difficult for you to catch the IceLady. The game is rather simple, and the action is limited. The main complaint I have is the large amount of time it takes to load each segment. This is most frustrating when you repeatedly land on the roulette, expenses, or flat tire screens. After you've landed a couple of times, you know what to expect. The text doesn't change, only the numbers. But loading seems to take for-

ever. As a result, the game is too simple for adults and too slow for children, who would lose interest waiting for the different segments to load.

The graphics are not too bad, and there are some pleasant sound effects and music scattered throughout the game. To make the game more appealing, however, I'd prefer to see more player interaction. As it is, it seems that most of the time spent with Escape Route is spent waiting for segments to load.

CHRISTIAN FLEMING

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THE LANDMARK SERIES: DUALTOP 64 AND 128

"He started to sing as he tackled the thing that couldn't be done and he did it." This quote from Edgar Guest appears on the title page of the manual for The Landmark Series. The title of the collection and even the name of the company itself announce the same thing: These utilities and games from program-

mer Paul Murdaugh will perform like no other GEOS programs you've ever seen.

And they do. They have excellent RAM support, exceptional graphics, and lightning speed, and they're easy to use. To top it all off, they come with a clear and concise manual and a price to make you smile. The Landmark Series is a winner.

The star of the series unquestionably is DualTop, a file manager for both the 64 and the 128. DualTop's interface, as its name implies, presents you with two disk directories at once. The lists appear side by side, and you can scroll through each one. I might as well hit a negative point right off: To be honest, I'm not convinced I need this feature. I haven't found a practical advantage to it. Oh, I suppose it's handy to scroll through other directories looking for a file without closing your current disk, but I seldom have a need to do that.

The interface screen displays so much information that it looks cluttered and cramped. As for copying, it's just as easy to drop a file icon on a drive icon or, better yet, to use the keyboard shortcuts in GEOS 128. I certainly don't need to see the directory of a disk in order to do this. As a matter of fact, since you can't copy between disks in DualTop without opening both directories, this feature can actually slow you down.

If that were DualTop's sole claim to fame, I would leave it tucked away somewhere and never use it. Fortunately, this isn't the case. DualTop is a state-of-the-art file manager program. It's chock full of great, user-friendly features, the kind you'll find so intuitive and handy that you won't ever

want to be without them.

Formatting disks is handled with a very straightforward, easy-to-understand control panel. You can't accidentally format the wrong disk, a problem sometimes with deskTop. DualTop 128 takes advantage of 64K video RAM if you have it, using it to store the DualTop screen. This lets the screen appear almost instantaneously whenever you return from an application.

The 128 version also can be set to switch to the appropriate video mode (40 or 80 columns) without tossing a dialog box at you. Both versions include a set of buttons down the middle of the screen that activate some of the most-used file-handling functions. Most functions have keyboard equivalents.

GEOS's operating system has always had a problem recognizing more than two drives. Programmer Paul Murdaugh tackled the problem by having GEOS "see" drives in pairs. If you double-click on a data file on drive B, for example, GEOS checks both drives A and B for the application to run that file. The same is true of drives C and D, but GEOS won't check drive B or A if you try to open a file on drive C. The deskTop skirts the issue by forcing you to swap drive C into position A or B, keeping things paired the way GEOS wants.

That wasn't good enough for Murdaugh, though. He wanted full four-drive support, with all four drives equally accessible from anywhere in the GEOS environment. The problem is only partially resolved in DualTop itself, but Murdaugh has released a series of upgrade patches for each of the main GEOS applications which will make them fully

four-drive compatible.

DualTop supports four drives without the patches if you take care where you place your files. It will access the 1541, 1571, and 1581 drives as well as the Commodore 1700 series REUs. Creative Micro Design's RAM devices, the RAMLink and RAMDrive, are also supported, as is the new FD-series drives. As long as you use Gateway to boot your system, DualTop will even access native mode partitions of any size on the CMD devices. This level of device support is unprecedented outside CMD's Gateway, and Gateway can't use four drives.

One feature above all the others puts DualTop on the cutting edge of GEOS file management: the RAM drive priority system. Without this, if you double-click on a data file, the system will start looking for the required application on the same disk as the data file. Unfortunately, if you have your data file and application on a 1571, for example, it'll run from that drive even if you also have the application loaded on your RAM device. DualTop automatically looks for your applications in RAM first, regardless of which drive your data is on, running only from the physical drive if necessary. That means that no matter where you open your file, the application will run from the fastest possible location.

All of this adds up to an outstanding piece of work, despite what I consider an unnecessarily cluttered interface screen. Even with the clutter, DualTop is the perfect file manager application for GEOS. It easily has the power and features to efficiently—no, elegantly—handle the most high-powered

GEOS systems. You can even set it up to load automatically on boot instead of the deskTop!

As if that weren't enough, the Landmark disk also includes several other GEOS utilities and games. Murdaugh's versions of Tetris and Solitaire are well designed. The 80-column versions require the 64K video upgrade to create magnificent color graphics.

Also requiring the video upgrade is a program called Lacell. This graphics display utility uses the extra video RAM to display BASIC 8 and I-Paint graphic images as well as large geoPaint pictures. Some modes involve interlacing, which meant a lot of flickering on my monitor, but the program certainly displays some impressive images. Unfortunately, the program doesn't import the various images into geoPaint, just displays them on your screen. If you're a graphics aficionado, however, and hate to leave GEOS to view your collection, Lacell is for you.

The Landmark Series is a good example of the skill and innovation of the current crop of GEOS programmers. DualTop is an outstanding program, at the top of its class. The games and Lacell are respectable additions to any GEOS library. Support of the top-of-the-line hardware such as the FD-series drives and a wealth of user-friendly features make this package one of the best to come along this year for serious GEOS users.

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FEEDBACK

Questions and answers about bugs in programs, a way to blank an inactive screen, and more.

Bug-Swatter

Kenneth Robinson of Keyport, New Jersey, pointed out a problem with the CHANGE command in DeMON (December 1992) that causes it to process BRANCH assembly code incorrectly.

To correct the problem, load DeMON back into MLX with the original starting and ending addresses of 8000 and 9967, respectively. Select the Enter Data option and enter the following line.

9168: BD 1F 99 86 71 85 FB A0 08

Be sure to save the program before you quit MLX.

Roger Mollen of Rogers, Minnesota, noticed a checksum error with the flashing message program in the November 1992 "Feedback" column. The problem was the DATA statement in line 70. Here's the correct listing.

70 DATA 4,41,15,197,6,208,
9,177,2,41

Screen Blanker

If I leave the same screen displayed on my monitor for long periods of time, the image stays even after I clear the screen. Could you provide me with a machine language program for my 64 that will blank the screen if the user doesn't press a key after a specified time?

JOHN NESBITT
HICKORY, NC

The machine language program listed here blanks the screen to the current border color if a keypress doesn't occur within five minutes.

; Screen blanker
; First, redirect IRQ vector to BLANK.
SEI ;disable IRQ interrupts
LDA #<BLANK ;store BLANK

address in vector

STA 788

LDA #>BLANK

STA 789

JSR ZEROCLK ;go zero jiffy clock

CLI ;reenable IRQ interrupts

RTS ;and return to BASIC

BLANK

LDA 197 ;check for last keypress

CMP #64 ;Has no key been pressed?

BEQ SCRBLK ;Yes, so check screen

JSR ZEROCLK ;A keypress has occurred. Reset timer

LDA 53265 ;and turn on screen

ORA #00010000 ;turn on bit 4

STA 53265

EXIT

JMP 59953 ;execute normal IRQ interrupts

SCRBLK

LDA 53265 ;Is screen blank?

AND #00010000 ;bit 4 controls screen blanking

BEQ EXIT ;Yes, so leave

LDA 161 ;Has time expired?

CMP #71 ;timer set for 71 x 4.2267 secs, or 5 min.

BCC EXIT ;No, so exit

LDA 53265 ;Yes, so blank screen

AND #11101111 ;turn off bit 4

STA 53265

BNE EXIT ;and leave

ZEROCLK

LDA #0 ;Zero jiffy clock to

"000000"

STA 160

STA 161

STA 162

RTS

The routine runs off the IRQ interrupt. IRQ interrupts take place once every 1/60 second on the 64. During the interrupt, the computer performs certain housekeeping routines: updating the jiffy clock, flashing the cursor, scanning the keyboard for a keypress, and so on. The 64 locates the code for these routines using the two-byte pointer, or vector, at location 788. Ordinarily, this vector points to 59953.

The first part of the program points the IRQ interrupt vector at 788 to our custom screen-blanking routine (BLANK). It also sets the jiffy clock (160-162), which serves as our timer, to 0.

Each time BLANK is called, it checks for a keypress. If one has occurred, it zeros the clock, turns on the video display by setting bit 4 of location 53265, and exits through the normal interrupt routine.

If no key has been pressed, the routine checks the screen display. If it's off, the routine exits to BASIC. Otherwise, it examines the timer to see whether it has reached the specified limits (in this case, five minutes). If it has, the routine blanks the screen display and exits.

If you'd prefer a longer or shorter delay before the screen blanks, adjust the number 71 in the SCRBLK part of the program. This byte represents the number of 256-jiffy intervals (4.2267 seconds) that take place between key-strokes before the screen is blanked. If you wanted the delay to be only two minutes (120 seconds), for instance, you'd change the 71 to a 28 (120 ÷ 4.2267 = 28.4).

For those readers who don't have a machine language monitor, here is the equivalent program in the form of a BASIC loader. To change the delay time, use the above formula and enter the number in the single DATA statement in line 180. The default, like the machine language version, is approximately five minutes.

```
AH 100 FOR X=0 TO 69:READ A:PO
KE 49152+X,A:NEXT
HB 110 SYS49152:PRINT "{CLR}
{WHT}{DOWN}SCREEN BLANK
ER IN PLACE"
BX 120 DATA 120,169,16,141,20,
3,169,192,141,21,3
PJ 130 REM CHANGE VALUE IN LIN
E 180 TO CHANGE TIME TO
BLANKING
QA 140 DATA 32,59,192,88,96,16
```



```

5,197,201,64,240,14
HB 150 DATA 32,59,192,173,17,2
08,9,16,141,17,208
KR 160 DATA 76,49,234,173,17,2
08,41,16,240,246,165
KJ 170 DATA 161,201
BG 180 DATA 71
FQ 190 DATA 144,240,173,17,208
,41,239,141
GG 200 DATA 17,208,208,230,169
,0,133,160,133,161,133
SJ 210 DATA 162,96,1,254

```

Old Software

I'm trying to find old programs such as accounting software, but it seems that most stores no longer carry them. Is there someone I can contact to buy old out-of-date software?

BETTY DESJARDIN
EAST GREENVILLE, PA

Contact Bare Bones Software, 940 4th Avenue, Suite 222, Huntington, West Virginia 25701; (800) 638-1123. It stocks a variety of used programs for most computers. Call and ask about specific programs or request a free catalogue. Be sure to specify the type of computer you have.

Hex Converter

You've probably covered this several times already, but I'd like to have a short program that will let me convert decimal numbers to hexadecimal on my 64.

BRAD STAPLETON
LIMA, OHIO

We have printed a number of conversion programs over the years, but it's a common request. Here's a version that does what you ask followed by one that converts from hex to decimal.

```

10 INPUT "{CLR}DECIMAL NUMBER TO CONVERT"; DC
20 HX$ = " ": DC=DC/4096: FOR K=1 TO 4: DC%=DC: HX$=HX$+CHR$(48+DC%-(DC%>9)*7)
30 DC=16*(DC-DC%): NEXT K
40 PRINT "{DOWN} HEX EQUIVALENT IS ";HX$

10 INPUT "{CLR}HEX NUMBER TO CONVERT"; HX$

```

```

20 DC=0: FOR K=1 TO LEN(HX$):
DC%=ASC(HX$): DC%=DC%-48+(DC%>64)*7
30 HX$=MID$(HX$,2): DC=16*DC+DC%: NEXT K
40 PRINT "{DOWN}DECIMAL EQUIVALENT IS ";DC

```

For a full-featured conversion program that allows you to convert between any numbering system from base 2 through base 64, see *Number Base Conversions* by Bruce Bowden in this issue's program listings.

Colorful Subroutines

I use a lot of subroutines when I program. I usually set them off with REM statements or lines that contain only colons, but I'd like to make them stand out even more so I can quickly locate them. I once saw a program listing whose routines appeared in various colors. How can I use this effect in my programs?

WINSTON SALE
SAN ANTONIO, TX

When you write a PRINT statement and want to change text colors, you press the Ctrl key and one of the number keys to select the desired color. When in quote mode, if you press Ctrl-2 for white, a reverse E appears on screen. Press Ctrl-3 for red, and a reverse British pound sign (£) appears. These symbols are the computer's color tokens. You can use these tokens to make different sections of a program listing appear in different colors.

First, load into memory or write a short program to use as a test. Then decide which tokens represent the colors you want. Let's use white and red in this example and arbitrarily select the lines after line 25 to appear in white and the lines after line 55 to appear in red.

Type the following line, but

do not press Return.

```
25 REM " "
```

After typing the second quote, press the Del key once to delete it. This makes sure you are not in quote mode.

Now hold down the Ctrl key and press the 9 key (Rvs On). This turns on reverse character mode. Now press Shift-M. This prints a reversed back slash, which is the token for Return. Now enter the key that prints the color token for your desired color. In this case we want the listing to appear in white, so press the E key (not Ctrl-2) to print that token. Then press Return. Line 25 should look like this:

```
25 REM " £
```

This REM line will call for a color change to white.

Repeat the process at the next subroutine where you want a color change, line 55 in this example. To change it to red, repeat the process, but press the pound key to produce the token (£) for red. That line should look like this:

```
55 REM " £
```

Now list your program. Lines up through 25 should be in the color that your cursor was when you typed LIST. At line 25 you should see REM" followed by a blank line with the text up to line 55 in white.

At line 55 you should see another REM", a blank line, and then the remaining text printed in red.

Send your questions and comments to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

A source for old software, another hexadecimal converter, and program listings in different colors

D'IVERIONS

Fred D'Ignazio

MULTIMEDIA ILLUMINATIONS

IBM asked me to present its Illuminated Books and Manuscripts at the company's recent EduQuest Executive Conference in Atlanta. This product is a collection of multimedia illuminated works that include Shakespeare's *Hamlet*, the essays titled "Black Elk Speaks," Martin Luther King's 1963 "Letter from a Birmingham Jail," Tennyson's poem *Ulysses*, and the Declaration of Independence. I have

ers, by you and me. The new media is not meant to be another spectacle. It's an opportunity for all of us—the masses—to be artists, musicians, sculptors, and composers.

So when IBM approached me to demonstrate its product, the last thing I wanted to do was show it like a movie. So I called up a fourth-grade teacher, Bill Lang, and asked him if he could organize a field trip to my studio to see how his nine-year-old kids would do illuminating their own original works using IBM's product. Bill said yes,

voice ringing through the crisp capital air.

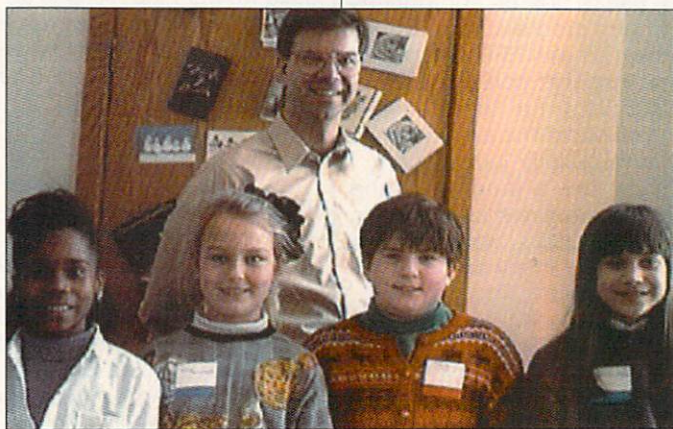
But the high point was seeing and hearing the children's own words. The children rehearsed their works and read them proudly into the computer microphone. And the words themselves were exceptional—free of sloppy misspellings, immature constructions, and embarrassing imperfections. The children had been writing all year long under Mr. Lang's guidance. They wrote every day in class and for homework. They wrote journals, biographies, poems, letters, and short stories. And it showed. Beneath all the multimedia illumination, it showed!

And it reminded me that words are the basis for all our thinking. The little voice that speaks to each of us in the hollows of our minds is a voice of words, not images, pictures, or music. We get the pictures, too, if we're lucky. But first of all come the words.

That started me thinking: What will be the result if all linguistic (or word-oriented) thinking is replaced by this multimedia Babel? What will we be like if we lose the primacy of words? What will happen if we each think in a different, multimedia tongue—some of us in images, some in sounds?

Maybe writing, at least, should be protected. Writing doesn't have to be the end of our young authors' creative expressions. They can use their words as a launch pad from which to illuminate their ideas. They can link written words to images, music, spoken words, and movies to illustrate and communicate rich and complicated ideas. Writing, it seems, is the basis for thinking. And Bill Lang's young writers have shown us some beautiful thinking through their multimedia illuminations but, most of all, through the words that they eloquently created. □

Bill Lang with
multimedia authors
Attallah Price
(left), Sara Comstock,
Mariko Hachiya,
and Dana Clifford.



watched the way people take this magnificent product and become humbled.

The product is so stunning, so overwhelming, that you feel timid and uncreative in comparison. It's a little like entering a giant sports arena, or attending a Broadway play, or watching Michael Jordan swoop through the air toward the basket, or gazing in awe at the Grand Canyon.

But this feeling is wrong, wrong, wrong! The new media is not just a spectator sport for millions of hyper-couch potatoes. It's going to be cheap, fast, and easy to use. It doesn't have to be crafted by the likes of Lucas, Spielberg, and Schwarzenegger. It can be created by toddlers, teach-

and the rest is history.

In Atlanta, I presented the fourth graders' illuminated works to hundreds of educators from all over America. On a giant nine-foot screen with a public-address system carrying the children's digitized voices, I demonstrated letters they had written to their newly inaugurated president and their poems about everyday life, including Grover, Charlie Brown, and ice cream. The children's multimedia illuminations were extraordinary. They taped segments of President Clinton's inaugural address and keyed them to words in their own letters. They captured clips of Maya Angelou's magnificent inaugural-day poem and replayed her rich

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MACHINE LANGUAGE

Jim Butterfield

SCREEN SCREAMER

One of the first programs I wrote to show the power of machine language was a "screen screamer." Touch a key and the whole screen changes instantly.

This version of the program is for the 64. It works by poking screen memory directly. That's not always a good idea, but it's fast and effective here.

The program is written two different ways. The first is genteel; the second is brute force. We'll discuss their respective merits later.

The approach is the same in both cases. We call for a character from the keyboard by means of the GETIN subroutine at hexadecimal FFE4. If a key has been pressed, we send a thousand copies of it to screen memory. Here's the genteel code.

2000 : JSR \$FFE4 : TAX : BEQ \$2000

If a key has been received, we store the screen address (\$0400 on the Commodore 64) into an indirect pointer at \$FC/D.

LDY #\$00 : STY \$FC : LDY #\$04 : STY \$FD

Here comes our big loop to store 250 values; we call it four times to get the 1000 screen memory locations.

200E : LDY #\$00

Here comes our little loop.

2010 : 91 FC STA (\$FC),Y : INY : CPY #\$FA : BCC \$2010

We must bump our indirect pointer 250 locations further along. While we're doing the arithmetic, the value in A may be pushed to the stack.

PHA : CLC : LDA \$FC : ADC #\$FA

**: STA \$FC
LDY \$FD : BCC \$2024 : INY
2024 : STY \$FD : PLA**

The big loop tests to see if the indirect address has gone outside limits. If not, the program loops back.

CPY #\$08 : BCC \$200E

The key is now tested to see if it's a Return key being pressed. If not, we wait for another key. Otherwise, we exit the program.

**CMP #\$0D : BNE \$2000
RTS**

The above code wouldn't be hard to modify for differently sized screens. That's what makes it genteel. It could be made even better, however, by having it loop 25 times, each loop clearing 40 characters (one screen line). That way, the change to other screen aspects would be even simpler.

Here's the brute force method of programming.

3000 : JSR \$FFE4 : TAX : BEQ \$3000

This time, there's only one loop, containing four instructions that smash the data into the screen area.

LDY #\$00

The four addresses need to be calculated carefully. Once in, they do the job efficiently.

3008 : STA \$0400,Y : STA \$04FA,Y : STA \$05F4,Y : STA \$06EE,Y

We walk the loop along in the usual way with the Y register.

INY : CPY #\$FA : BCC \$3008

As before, we test to see if the key pressed was Return. If not, we wait for another key.

**CMP #\$0D : BNE \$3000
RTS**

This program is visibly shorter than the previous one. It runs faster, although the average user isn't likely to notice the difference. But the program isn't so easy to change to fit a new screen configuration. An 80-column screen, for example, would need eight STA instructions in the loop.

If you have an older 64, this program might show some interesting effects. Both the screen memory and color arrangement were changed a couple of times.

If it sets all screen characters to the same color, you have a recent machine. If some parts of the screen show in white rather than the current color, you have an original 64. And if parts of the screen don't seem to have any characters, you have the in-between machine. (The characters are there, but they're printed blue-on-blue.)

Here is a BASIC loader for Screen Screamer. Watch the screen change instantly as you press various keys.

```
CB 100 DATA 32,228,255,170,240,250,160,0,132,252,160,4,132,253,160,0
JB 110 DATA 145,252,200,192,250,144,249,72,24,165,252,105,250,133,252
CE 120 DATA 164,253,144,1,200,132,253,104,192,8,144,27,201,13,208,209,96
BM 200 DATA 32,228,255,170,240,250,160,0,153,0,4,153,250,4
KD 210 DATA 153,244,5,153,238,6,200,192,250,144,239,201,13,208,227,96
FX 300 FOR J=8192 TO 8239
DS 310 READ X:T=T+X
DD 320 POKE J,X
PP 330 NEXT J
CE 350 FOR J=12288 TO 12317
EC 360 READ X:T=T+X
XE 370 POKE J,X
HS 380 NEXT J
BQ 390 IF T<>12130 THEN STOP
DH 400 PRINT "SCREEN SCREAMER {SPACE}..."
PP 410 PRINT "(PRESS RETURN TO END)"
BS 420 INPUT "PROGRAM 1 OR 2"; P
DH 430 S=0
CC 440 IF P=1 THEN S=8192
KQ 450 IF P=2 THEN S=12288
XM 460 IF S=0 GOTO 420
CE 470 SYS S
```

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PROGRAMMER'S PAGE

Randy Thompson

PLAY IT AGAIN, VINCE

This column might look familiar to some of our longtime readers, but when we first published this collection of wild sound effects written by Vince Tagle, we accidentally mixed some of the program listings with those from a previous column—oops! While it took us a while to discover our error, I think you'll find these sounds for the 64 well worth the wait.

THREE REASONS

```
XE 10 REM THREE REASONS
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
MX 30 POKE 54277,8:POKE
    {SPACE}54278,255:P
    OKE 54276,23
GX 40 F1=100:F2=4
JB 50 FOR Z=1 TO 3:POKE
    {SPACE}54287,F2
CD 60 FOR F1=1 TO 200
ED 70 POKE 54273,F1:F2=F
    2+.01
HB 80 NEXT F1,Z
RB 90 POKE 54278,15
```

RINGING ALARM

```
FC 10 REM RINGING ALARM
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
MX 30 POKE 54277,8:POKE
    {SPACE}54278,255:P
    OKE 54276,23
FM 40 POKE 54287,40
HD 50 FOR Z=1 TO 7
SD 60 FOR F1=255 TO 0 ST
    EP -6:POKE 54273,F
    1:NEXT F1
EP 70 FOR F1=0 TO 255 ST
    EP 20:POKE 54273,F
    1:NEXT F1,Z
KS 80 POKE 54278,15
```

HARMONICS

```
BP 10 REM HARMONICS
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
FP 30 AD=15:SR=190
AQ 40 POKE 54284,AD:POKE
    54291,AD:POKE 542
    92,SR
HX 50 POKE 54283,21:POKE
    54290,23
DB 60 FOR F1=200 TO 1 ST
    EP -10:POKE 54273,
```

```
F1
RB 70 FOR F2=200 TO 1 ST
    EP -50:FOR F3=1 TO
    4:POKE 54280,F2:P
    OKE 54287,F3
MQ 80 NEXT F3,F2,F1
FJ 90 FOR Q=15 TO 0 STEP
    -1:POKE 54296,Q:N
    EXT Q
```

FALLING STAR

```
BQ 10 REM FALLING STAR
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
KD 30 POKE 54277,4:POKE
    {SPACE}54278,12
PE 40 F2=150:Q=50
PF 50 FOR Z=1 TO 50
KJ 60 F1=INT(100*RND(1))
    +10:POKE 54276,23
JJ 70 FOR T=1 TO Q:NEXT
    {SPACE}T
AB 80 POKE 54273,F1:POKE
    54287,F2:POKE 542
    76,20:Q=Q-1:F2=F2-
    3
SB 90 NEXT Z
CG 100 POKE 54273,30:POK
    E 54280,0
```

LAST XITHER

```
EC 10 REM LAST XITHER
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
MX 30 POKE 54277,8:POKE
    {SPACE}54278,255:P
    OKE 54276,23
QX 40 F1=100
AJ 50 FOR Z=1 TO 24:F2=3
    0:POKE 54273,F1
PD 60 FOR Y=1 TO 10:POKE
    54287,F2:F2=F2*1.
    01:NEXT Y
GS 70 F1=F1+8
FA 80 NEXT Z
RB 90 POKE 54278,15
```

STAR WALKER

```
BF 10 REM STAR WALKER
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
MX 30 POKE 54277,8:POKE
    {SPACE}54278,255:P
    OKE 54276,23
SJ 40 FOR Z=1 TO 2:F1=100
PE 50 FOR Y=1 TO 6:F2=10
    0:POKE 54273,F1
GJ 60 FOR X=1 TO 4:POKE
    {SPACE}54287,F2:F2
    =F2*1.02:NEXT X:F1
    =F1*1.2
PD 70 FOR W=1 TO 8:F2=20
    0:POKE 54273,F1
FC 80 FOR V=1 TO 3:POKE
    {SPACE}54287,F2:F2
    =F2*1.2
```

```
MQ 90 NEXT V:F1=F1/1.2:N
    EXT W,Z
RH 100 POKE 54278,15
```

HYPER WARP

```
GM 10 REM HYPER WARP
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
PE 30 POKE 54277,8:POKE
    {SPACE}54278,255:P
    OKE 54276,21
PM 40 F1=2
QD 50 FOR Z=1 TO 24:F2=8
    0:POKE 54273,F1
FB 60 FOR Y=1 TO 5:POKE
    {SPACE}54287,F2:F2
    =F2*1.1
SF 70 NEXT Y:F1=F1+9:NEX
    T Z
KS 80 POKE 54278,15
```

STAR PRINTER

```
AD 10 REM STAR PRINTER
KE 20 FOR L=54272 TO 542
    95:POKE L,0:NEXT:P
    OKE 54296,15
MX 30 POKE 54277,8:POKE
    {SPACE}54278,255:P
    OKE 54276,23
XC 40 FOR Z=1 TO 3:F1=15
BX 50 FOR Y=1 TO 9:F2=15
    :POKE 54273,F1
BP 60 FOR X=1 TO 5:POKE
    {SPACE}54287,F2:F2
    =F2*1.5 :NEXT X:F1
    =F1*0.8
AP 70 FOR W=1 TO 12:F2=2
    0:POKE 54273,F1
HX 80 FOR V=1 TO 6:POKE
    {SPACE}54287,F2:F2
    =F2*0.8
MQ 90 NEXT V:F1=F1/1.2:N
    EXT W,Z
RH 100 POKE 54278,15
```

More, Please

I know there are more audio hackers lurking out there with some cool sound effects. How about sending them in and sharing them with our readers? Our address is listed below.

"Programmer's Page" is interested in your programming tips and tricks. Send all submissions to Programmer's Page, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We pay \$25-\$50 for each tip that we publish in Gazette. □

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on your 64,
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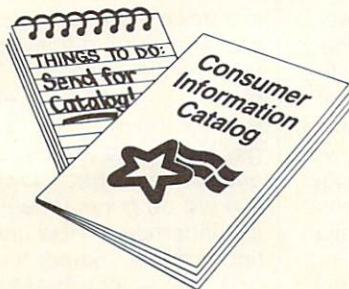
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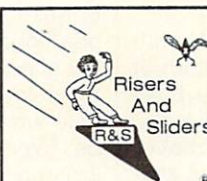
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Steve Vander Ark

IMAGES IN LAYERS

No desktop publishing program or word processor can do as much with a blank sheet of paper as geoPublish. It's an amazing program, but it's also one of the more complicated programs around.

As a result, this program generates plenty of questions and plenty of frustrated users. This is because geoPublish pushes the limited resources of the 64 more than any other program. The result is a great program, but one that has a few quirks. So read on for the lowdown on that wonderful, powerful, exciting, and sometimes downright baffling marvel called geoPublish.

One of the key concepts behind geoPublish is the way it handles graphics. Most users come to geoPublish fresh from experiences with geoPaint. But geoPaint uses an entirely different type of graphics manipulation, and anyone who approaches geoPublish expecting geoPaint will be quickly confused.

Bear in mind that geoPaint is a bitmap editor, a program that lets you create patterns of dots in the shape of whatever you want to draw. Think of the geoPaint page as a large sheet of graph paper with tiny squares. You create pictures by using the various graphics tools to fill in the little squares to create dots. In fact, if you zoom in while you're in pixel edit mode, you'll see the grid that looks like graph paper, and you can fill or erase the dots with the cursor.

Everything you create with geoPaint is a large pattern of dots. Tools such as the polygon or the spray can fill in the dots to make whichever shape or design they're programmed to make. Even the text tool just fills in dots to make whichever letter you choose. If you want to change

something on a geoPaint page, you have to eradicate it dot by dot. If you create one thing on top of another, the new image replaces the old.

All that sounds pretty straightforward, but there's a big difference between the way geoPaint handles images and the way geoPublish does it. GeoPublish uses what are called object-based graphics. This means that a geoPublish page doesn't exist as a large grid of dots but as a set of individual, mathematically defined shapes all lying in layers. Each shape or object is a separate entity, even if it's placed near or on top of another to create a larger image. Every image on a page is an object.

The fact that the image is stored in memory as a mathematical equation instead of a grid of dots has many advantages. For example, if you want the object to be bigger, you can resize it by mathematically changing the equation. Make a geoPaint object bigger, and you'll see jaggies where the individual dots have been enlarged. A geoPublish object is redrawn by the program using larger numbers, so there are no jaggies.

Even more helpful is the fact that you can change an object without changing anything around it. In fact, since each object has its own layer, changes won't affect anything under or above that object. If you want a line to be thicker, for example, you simply pick it up from the page, change it, and then put it back. A piece of text can be changed from one font or style to another without affecting the filled rectangle below it or even leaving a hole where the text used to be. Everything on a geoPublish page is adjustable, which means you can play with a page until every element is perfect. Go back to geoPaint and you'll miss this flexibility.

I've mentioned layers a few times. That's a concept that causes problems for people. After all, once you've plopped down a dozen objects to get the effect you want, it's easy to forget that the whole thing isn't just one big picture as it would be in geoPaint. The computer has no idea what you've created, so when you pull out an object near the bottom to make an adjustment and then put it back, the computer puts it on top. That's why, if you've just altered it, a drop shadow you created when you started now covers everything.

This happens a lot, and it really throws people. Here's another example. Suppose you laid down a dark gray rectangle and then placed some text in white on top of it. You'd have a great-looking effect. But if you pick up the rectangle, change its color to black, and then put it back down, the text will be gone. Where is it? It's underneath. How can you find it again? Select the box and then select the Move to Back tool from the toolbox. The box is now placed at the bottom of the stack, and the text becomes visible again. Of course, if you simply pick up and move the box, you still won't see the text because it's white text on a white background. See how the confusion starts?

Next month I'll talk about some of the other quirks of this wonderful program. I'll run through the various ways a bitmapped geoPaint image can be incorporated into your object-based geoPublish page. I'll also talk about the different modes you can use in geoPublish. In the meantime, break out your copy of geoPublish and give it another try. Make a few posters or a newsletter just for the sake of trying things out. Don't let this powerful and exciting program gather dust on a shelf! □

GeoPublish is a powerful and exciting program, but don't let it baffle you.

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BEGINNER BASIC

Larry Cotton

USER PORT ALARM CLOCK

This month and next we'll take a look at one of the Commodore 64's superaccurate built-in clocks and learn how to set and read it in BASIC. At the request of a reader in Trinidad, we'll write a short program which uses that clock to control the user port.

We'll see how to control each of its eight lines independently, but what you control will be strictly up to you.

The 64's two Time of Day (TOD) clocks count in tenths of a second and are as accurate as the frequency of the AC power that your computer is plugged into. These clocks are relatively easy to program. We'll access the clock that uses memory registers 56328-56331. (The other TOD clock uses registers 56584-56587 and is accessed similarly.) To set the clock, poke values into the following registers.

Function	Register
Hours	56331
Minutes	56330
Seconds	56329
Tenths of Seconds	56328

To read the clock, we'll peek at these registers and print a digital clock on the screen based on what's there. Then we'll use an IF-THEN statement to take some action when the "alarm" goes off. Unlike a more sophisticated machine language clock that runs in the background, this one just counts elapsed seconds, and you can't do anything else while the clock is displayed. Here's the program listing.

```
DS 40 PRINTCHR$(147):POKE53281,14:POKE646,6
KR 50 PRINT"SET CLOCK AT :{DOWN}"
XC 60 R=8:GOSUB290:K=43200
GX 70 IFI$="PM"THENX=K
```

```
ER 80 FORI=1TO3:H=INT(T(I)/10):L=T(I)-10*H
      T(I)=16*H+L:NEXT
MC 90 C=56331:POKEC,T(1):POKEC-1,T(2):POKEC-2,T(3)
FA 100 PRINT"{DOWN}ACTIVE USER PORT AT:{DOWN}"
FD 110 R=18:GOSUB290
HS 120 IFI$="PM"THENY=K
JB 130 B=Y+T(1)*3600+T(2)*60+T(3)
SK 140 PRINT"{DOWN}PRESS ANY KEY TO START CLOCK.{DOWN}"
RE 150 GETAS:IFA$=""THEN150
SB 160 POKEC-3,0
PH 170 H=PEEK(C):M=PEEK(C-1):S=PEEK(C-2):T=PEEK(C-3)
XG 180 C1$=CHR$(16ANDH)/16+48+CHR$(15ANDH)+48)
XM 190 H=VAL(C1$)*3600
GJ 200 IFC1$="00"THENC1$="12"
HD 210 C2$=CHR$(240ANDM)/16+48+CHR$(15ANDM)+48):M=VAL(C2$)*60
FD 220 C3$=CHR$(240ANDS)/16+48+CHR$(15ANDS)+48):S=VAL(C3$)
HA 230 A=X+H+M+S:IFA=2*KTHENPOKEC,0:POKEC-3,0:X=0
SG 240 IFA=BTHEN420
BJ 250 IFA<KTHENJ$="AM":GOTO270
XX 260 J$="PM"
MD 270 PRINT"{WHT}TIME IS "C1$+":"+C2$+":"+C3$+":"+T;J$+">{UP}"
HG 280 GOTO170
DE 290 HS="":INPUT"HOURS";HS:IFHS<"0"ORHS>"9"THENPRINT"{2 UP}":GOTO290
KE 300 T(1)=VAL(HS):IFT(1)<0ORT(1)>12THENPRINT"{2 UP}":GOTO290
RA 310 IFT(1)=12THENT(1)=0
HP 320 MS="":INPUT"{DOWN}MINUTES";MS:IFMS<"0"ORMS>"9"THENPRINT"{3 UP}":GOTO320
PG 330 T(2)=VAL(MS):IFT(2)<0ORT(2)>59THENPRINT"{3 UP}":GOTO320
CE 340 SS="":INPUT"{DOWN}SECONDS";SS:IFSS<"0"ORSS>"9"THENPRINT"{3 UP}":GOTO340
T(3)=VAL(SS):IFT(3)<0ORT(3)>59THENPRINT"{3 UP}":GOTO340
DC 360 PRINT"{DOWN}AM OR PM (PRESS A OR P)"
HD 370 GETIS:IFIS<"A"THENIFIS<"P"THEN370
EE 380 IFIS="A"THENIS="AM":GOTO400
FH 390 IS="PM"
JD 400 POKE214,R:PRINT:POKE211,24:PRINTIS
EX 410 RETURN
XD 420 PRINT"{CLR}{DOWN}USER PORT ACTIVATED."
```

When you run this program, you're asked to enter three values and an A or P (for a.m. or p.m.) to set the clock, which will be accurate to the nearest second. The values that you enter can range from 0-12 for hours and 0-59 for both minutes and seconds. It's not necessary to enter all of the values as two digits. For instance, to set 1:06 p.m., just type 1, 6, 0, and P at the four prompts. (Press Return after each number, but not after P.) To set 12:00:04 a.m. (four seconds past midnight), type 12, 0, 4 and A. I avoid setting exactly noon or midnight because I'm never sure if the time is a.m. or p.m. then.

Repeat this process to set the time for the user port to be activated. (Think of this as the alarm.) Like a new alarm clock, the port must be set to activate within 24 hours of starting the clock. Then press any key to start the clock.

At the selected time for the user port to be activated, the alarm goes off, and you'll see a message to that effect. However, the user port hasn't been set up yet; more programming is necessary.

Next month I'll explain the program, discuss the user port, and add the necessary code that actually turns on the user port lines. □

Take a look at one of the 64's built-in clocks and learn how to use it to control the user port.

Minesweeper

By Robert B. Cook

Minesweeper, despite its military-sounding theme, is an ideal alternative to shoot-'em-up games. Rather than dealing with destruction, this game for the 64 provides you with excellent mental exercise.

You are presented with a grid that must be cleared of hidden mines as quickly as possible. Use a joystick in port 2 to maneuver around the screen.

Minesweeper is written in machine language, but it loads and runs like a BASIC program. To enter it, use MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following addresses.

Starting address: 0801

Ending address: 1400

Be sure to save the program before exiting MLX.

Begin Play

After the opening screen, you'll be prompted for the number of mines you want hidden on the playing screen. Move the joystick up and down to change the numbers. You may select 16-64 mines. Press the fire button to begin the game.

Start to play by exposing each of the squares. Do this by placing the arrow on a square and pressing the fire button. One of three things will happen when you do. You'll uncover a blank space, a number, or a mine.

If you expose a blank space, you can be sure that there are no mines in the immediate vicinity. If you uncover a number, it indicates the number of mines within the eight squares surrounding the number. For example, if you expose a 3, the squares surrounding it might look something like the following.

```

- * -
- 3 *
* - -
    
```

The 3 indicates that there are three mines (indicated here by asterisks) bordering this square. Of course, the mines won't necessarily be in the positions shown here.

Exposing a mine will cause it to ex-

plode and subtract points from your score. The amount deducted depends on the number of mines you choose at the start of the game. You lose 10 points each for 64 mines. The score varies on up to 40 points each when you have 16 mines on the board. Of course, speed helps, too. You'll notice that your score drops by one point for every second of play.

Flag It

If you think that there is a mine at a particular square, you can flag it. Do this by placing the arrow on that square and pressing the F key. You can't expose a square when it is flagged. To unflag a square, press F again. It isn't necessary to flag all of the mines to win the game.

An All Clear siren will signal the end of the game when you've exposed all of the blank and numbered squares. If you want to quit one game and play another, press the Stop key. To quit the game entirely, choose 00 for the number of mines.

Strategy

As you play, you may find yourself stuck in one area. If that happens, try working toward your goal from a different direction.

MINESWEEPER

```

0801:15 08 40 00 0E 32 30 37 FA
0809:31 3A 52 42 43 20 56 37 2D
0811:2E 39 32 00 00 00 20 70 7D
0819:0B 20 BF 0B 20 08 0C 20 B8
0821:3C 0B 20 64 0C A5 F7 D0 14
0829:03 4C 3C 0B 20 DB 0C 20 AE
0831:38 0C 20 9F 0D 20 EF 09 30
0839:A5 B6 D0 03 4C 0D 0B AD 6E
0841:00 DC 29 1F C9 1E F0 25 6D
0849:C9 1D F0 32 C9 1B F0 41 A4
0851:C9 17 F0 53 C9 0F F0 67 33
0859:A5 C5 C9 15 F0 61 20 E1 67
0861:FF D0 D2 4C 34 0B A0 40 14
0869:20 04 0B F0 C8 A5 B1 F0 2C
0871:C4 C6 B1 38 AD 01 D0 E9 4C
0879:08 8D 01 D0 D0 E8 A5 B1 45
0881:C9 0F F0 B1 E6 B1 18 AD 4F
0889:01 D0 69 08 8D 01 D0 D0 DE
0891:D5 A5 B0 F0 A0 C6 B0 38 D4
0899:AD 00 D0 E9 10 8D 00 D0 C0
08A1:B0 C4 CE 10 D0 10 BF A5 02
08A9:B0 C9 0F F0 88 E6 B0 18 CE
08B1:AD 00 D0 69 10 8D 00 D0 D0
08B9:90 AC EE 10 D0 10 A7 C9 FB
08C1:15 F0 55 20 74 09 A0 00 4E
08C9:B1 FD AA 29 30 D0 46 8A F5
08D1:29 40 F0 20 A9 00 8D 86 95
08D9:02 A9 3F 20 D2 FF A9 60 89
    
```

```

08E1:20 D2 FF 20 56 0A C6 F8 1A
08E9:20 A8 09 C6 FA A5 F8 D0 F2
08F1:19 4C 0D 0B A9 03 8D 86 EE
08F9:02 8A 0A A8 B9 B1 10 20 4E
0901:D2 FF B9 B2 10 20 D2 FF 85
0909:C6 FA A0 00 B1 FD 09 10 F8
0911:91 FD 4C 6B 09 4C 36 08 99
0919:20 74 09 A0 00 B1 FD AA F0
0921:29 10 D0 F1 8A 29 20 F0 2F
0929:22 A9 06 8D 86 02 A9 C1 A1
0931:20 D2 FF A9 C2 20 D2 FF DE
0939:20 95 0A C6 F9 20 CD 09 63
0941:A0 00 B1 FD 29 DF 91 FD A3
0949:4C 67 08 A9 02 8D 86 02 4C
0951:A9 3D 20 D2 FF A9 3E 20 FB
0959:D2 FF 20 7A 0A E6 F9 20 80
0961:CD 09 A0 00 B1 FD 09 20 68
0969:91 FD A5 FA C5 F8 D0 A5 81
0971:4C 0D 0B 18 A5 B0 0A 69 3D
0979:04 A8 A5 B1 69 07 AA 20 64
0981:F0 FF A5 FC 85 FE A5 FB FF
0989:85 FD 18 65 B0 85 FD 90 5F
0991:02 E6 FE A4 B1 D0 01 60 BB
0999:18 A5 FD 69 12 85 FD 90 AA
09A1:02 E6 FE 88 D0 F2 60 A4 8E
09A9:B5 38 A5 B2 F9 A1 10 85 80
09B1:B2 B0 0C C6 B3 10 08 A9 CE
09B9:00 85 B2 85 B3 85 B6 20 1D
09C1:23 0A A9 02 85 A5 A5 F8 44
09C9:85 A6 10 08 A9 03 85 A5 D4
09D1:A5 F9 85 A6 A9 02 8D 86 47
09D9:02 A0 09 A6 A5 18 20 F0 5F
09E1:FF A9 00 A6 A6 20 CD BD D7
09E9:A9 A0 20 D2 FF 60 A5 A2 99
09F1:C9 5A 90 57 A5 B3 D0 07 AB
09F9:A5 B2 D0 03 85 B6 60 A9 47
0A01:00 85 A2 A9 0F 8D 0D A4 03
0A09:A9 11 8D 0C D4 A9 81 8D 86
0A11:0B D4 A9 64 8D 08 D4 38 C9
0A19:A5 B2 E9 01 85 B2 B0 02 54
0A21:C6 B3 A9 02 8D 86 02 A0 06
0A29:22 A2 02 18 20 F0 FF A5 23
0A31:B3 A6 B2 20 CD BD A5 D3 A5
0A39:C9 25 B0 05 A9 A0 20 D2 C4
0A41:FF A0 20 20 04 0B A9 80 A3
0A49:8D 0B D4 60 A9 00 99 00 08
0A51:D4 88 10 FA 60 A9 20 8D 1B
0A59:06 D4 A9 0A 8D 05 D4 A9 4F
0A61:81 8D 04 D4 A9 12 8D 01 19
0A69:D4 A9 00 8D 00 D4 A0 7F 3F
0A71:20 04 0B A9 80 8D 04 D4 A9
0A79:60 A9 49 8D 06 D4 A9 0A 0B
0A81:8D 05 D4 A9 11 8D 04 D4 6E
0A89:A9 32 8D 01 D4 A9 00 8D 9B
0A91:00 D4 F0 19 A9 F0 8D 06 BC
0A99:D4 A9 0A 8D 05 D4 A9 11 7C
0AA1:8D 04 D4 A9 23 8D 01 D4 D8
0AA9:A9 21 8D 00 D4 A0 7F 20 D4
0AB1:04 0B A9 10 8D 04 D4 60 47
0AB9:A0 00 B9 D1 10 99 00 D4 2E
0AC1:99 00 D7 C8 C0 07 D0 F2 E0
0AC9:A9 08 8D 18 D4 A9 12 85 DE
0AD1:02 20 F6 0A E6 02 C9 50 91
0AD9:D0 F7 A9 4F 85 02 20 F6 E9
0AE1:0A C6 02 C9 0E D0 F7 A9 D6
0AE9:40 8D 04 D4 8D 0B D4 A9 3B
0AF1:0F 8D 18 D4 60 A0 20 20 27
0AF9:04 0B A5 02 8D 01 D4 8D 4F
0B01:08 D4 60 A2 00 CA D0 FD 51
0B09:88 D0 FA 60 A0 0D 20 4D C3
    
```


PROGRAMS

```

0B11:0A 20 B9 0A 20 04 0B A4 D7
0B19:B4 B9 C3 10 C5 B3 90 09 98
0B21:D0 11 B9 C4 10 C5 B2 B0 15
0B29:0A A5 B3 99 C3 10 A5 B2 1A
0B31:99 C4 10 A9 00 8D 15 D0 13
0B39:4C 23 08 20 38 0C A0 00 74
0B41:A9 10 85 A5 A9 0C 85 D3 97
0B49:B9 FC 0F F0 0A 20 D2 FF E2
0B51:C8 C9 0D D0 F3 F0 ED 20 4C
0B59:7A 0A 20 04 0B 20 7A 0A 4B
0B61:20 04 0B C6 A5 D0 F9 A5 60
0B69:B5 D0 03 4C E2 FC 60 A9 29
0B71:00 8D 0E DC 85 58 85 5A 6D
0B79:A9 40 85 59 A9 D8 85 5B D1
0B81:A9 33 85 01 A2 09 A0 01 75
0B89:20 EC A3 A9 37 85 01 A9 75
0B91:01 8D 0E DC A2 00 BD 18 C3
0B99:11 9D 08 3C BD D0 11 9D 55
0BA1:C0 3C BD 88 12 9D 78 3D 9C
0BA9:BD 40 13 9D 30 3E E8 E0 18
0BB1:B8 D0 E3 A9 1E D0 18 D0 97
0BB9:A9 CB 8D 19 03 60 A0 18 CD
0BC1:20 4D 0A A9 8F 8D 18 D4 CE
0BC9:A9 80 8D 0E D4 8D 0F D4 37
0BD1:8D 12 D4 A9 0A 8D 25 D0 0A
0BD9:A9 0F 8D 26 D0 A9 0B 8D 6D
0BE1:27 D0 A9 80 8D 17 D0 8D EC
0BE9:1D D0 8D 1B D0 A9 01 8D E2
0BF1:1C D0 A0 3F B9 D8 10 99 3D
0BF9:80 03 88 10 F7 A9 0E 8D 33
0C01:F8 07 A9 04 85 B5 60 A9 3A
0C09:93 20 D2 FF A9 0B 8D 20 02
0C11:D0 A9 01 8D 21 D0 A0 FA 7D
0C19:A9 A0 99 FF 03 99 F9 04 D7
0C21:99 F3 05 99 ED 06 A9 0B 23
0C29:99 FF D7 99 F9 D8 99 F3 FC
0C31:D9 99 ED D4 88 D0 E1 A0 F3
0C39:00 B9 EF 0D F0 06 20 D2 41
0C41:FF C8 D0 F5 A2 10 A0 00 9B
0C49:B9 BD 0E F0 06 20 D2 FF D4
0C51:C8 D0 F5 C4 D0 F0 C8 B9 03
0C59:BD 0E F0 06 20 D2 FF C8 67
0C61:D0 F5 60 A0 00 A9 0A 85 B5
0C69:D3 B9 0E 0F F0 0A 20 D2 4F
0C71:FF C8 C9 0D D0 F3 F0 ED EB
0C79:20 95 0A A0 20 20 04 0B E6
0C81:20 95 0A A0 06 8D 86 02 60
0C89:18 A2 0E A0 13 20 F0 FF 1D
0C91:A4 B5 BE 99 10 86 F7 86 EB
0C99:F8 A9 00 20 CD BD A5 B5 01
0CA1:D0 05 A9 30 20 D2 FF A0 88
0CA9:7F 20 04 0B AD 00 DC 29 0B
0CB1:1F C9 0F F0 1C C9 1E F0 F1
0CB9:06 C9 1D F0 0C D0 ED A5 1F
0CC1:B5 C9 07 F0 C3 E6 B5 10 4C
0CC9:BF A5 B5 F0 BB C6 B5 10 65
0CD1:B7 A5 B5 B5 B4 C6 B4 06 6E
0CD9:B4 60 A9 F8 85 A5 A9 0B 4A
0CE1:85 FB 85 A7 A9 13 85 A6 32
0CE9:A9 14 85 FC 85 A8 A2 12 82
0CF1:A0 11 A9 80 91 A5 88 10 20
0CF9:FB 18 A5 A5 69 12 85 A5 69
0D01:90 02 E6 A6 CA D0 E9 A2 3B
0D09:10 A0 0F A9 00 91 A7 88 ED
0D11:10 FB 18 A5 A7 69 12 85 1C
0D19:A7 90 02 E6 A8 CA D0 E9 D5
0D21:A6 F7 A5 FB 85 FD A5 FC 6D
0D29:85 FE AD 1B D4 85 A7 AD E6
0D31:1B D4 29 3F 18 65 FD 85 FE
0D39:FD 90 02 E6 FE A5 A7 A8 AB
0D41:B1 FD D0 DE A9 40 91 FD 2B
0D49:CA D0 D7 A2 10 86 A5 A9 B1
0D51:F8 85 FD A9 13 85 FE A0 F0
0D59:0F 84 A6 A9 00 85 A7 A2 93
0D61:07 A0 13 B1 FD D0 16 BC C0
0D69:A9 10 B1 FD C9 40 D0 02 65
0D71:E6 A7 CA 10 F2 A5 A7 F0 B1
0D79:04 A0 13 91 FD 18 A5 FD D2
0D81:69 01 85 FD 90 02 E6 FE 7A
0D89:C6 A6 A4 A6 10 CD 18 A5 3D
0D91:FD 69 02 85 FD 90 02 E6 BA
0D99:FE C6 A5 D0 BA 60 A9 00 51
0DA1:85 A2 85 F9 85 FA 85 B0 4B
0DA9:85 B1 8D 10 D0 A9 3F 8D DE
0DB1:00 D0 A9 6D 8D 01 D0 A9 C7
0DB9:01 8D 15 D0 A9 E8 85 B2 16
0DC1:A9 03 85 B3 85 B6 A9 02 B9
0DC9:8D 86 02 A0 09 A2 02 18 85
0DD1:20 F0 FF A9 00 A6 F8 20 7F
0DD9:CD BD A0 22 A2 03 18 20 F1
0DE1:F0 FF A4 B4 B9 C3 10 BE 10
0DE9:C4 10 20 CD BD 60 13 11 F1
0DF1:1D 1D 12 1C C4 CA CA CA 97
0DF9:CA CA CA CA CA CA CA CA 14
0E01:CA CA CA CA CA CA CA CA 1D
0E09:CA CA CA CA CA CA CA CA 25
0E11:CA CA CA CA CA CA CA CA 28
0E19:0D 1D 1D 12 C8 4D 49 4E 24
0E21:45 53 3A 30 30 20 20 B6 F7
0E29:CC CD CE CF D0 D1 D2 CF 39
0E31:D3 D4 D5 B5 20 20 53 43 ED
0E39:4F 52 45 3A 39 39 39 C9 C8
0E41:0D 1D 1D 12 C8 46 4C 41 29
0E49:47 53 3A 30 30 20 20 20 8A
0E51:B7 B8 D6 D7 D8 D9 DA D7 8B
0E59:DB B8 B7 20 20 20 20 48 94
0E61:49 47 48 3A 30 30 30 C9 0D
0E69:0D 1D 1D 12 C6 C3 C3 C3 A8
0E71:C3 C3 C3 C3 C3 C3 C3 C3 8D
0E79:C3 C3 C3 C3 C3 C3 C3 C3 95
0E81:C3 C3 C3 C3 C3 C3 C3 C3 9D
0E89:C3 C3 C3 C3 C3 C3 C3 C7 A9
0E91:0D 11 1D 1D 12 1F C4 CA 4F
0E99:CA CA CA CA CA CA CA CA B5
0EA1:CA CA CA CA CA CA CA CA BD
0EA9:CA CA CA CA CA CA CA CA C5
0EB1:CA CA CA CA CA CA CA CA CD
0EB9:CA C5 0D 00 1D 1D 12 C8 98
0EC1:20 C1 C2 C1 C2 C1 C2 C1 37
0EC9:C2 C1 C2 C1 C2 C1 C2 C1 90
0ED1:C2 C1 C2 C1 C2 C1 C2 C1 98
0ED9:C2 C1 C2 C1 C2 C1 C2 C1 A0
0EE1:C2 20 C9 0D 00 1D 1D 12 32
0EE9:C6 C3 CB CB CB CB CB CB 81
0EF1:CB CB CB CB CB CB CB CB 0E
0EF9:CB CB CB CB CB CB CB CB 16
0F01:CB CB CB CB CB CB CB CB 1F
0F09:CB CB C3 C7 00 13 11 11 74
0F11:11 11 11 11 11 11 11 9C BA
0F19:0D 12 C4 CA CA CA CA CA 69
0F21:CA CA CA CA CA CA CA CA 3F
0F29:CA CA CA CA CA C5 0D 12 FE
0F31:C8 20 4E 55 4D 42 45 52 2B
0F39:20 4F 46 20 4D 49 4E 45 77
0F41:53 3A 20 C9 0D 12 C8 20 9A
0F49:20 20 20 20 20 20 20 20 67
0F51:20 20 20 20 20 20 20 20 6F
0F59:20 C9 0D 12 C8 20 20 20 E3
0F61:20 20 20 A7 1F B7 B7 B7 15
0F69:B7 9C A5 20 20 A0 20 20 25
0F71:20 C9 0D 12 C8 20 20 20 FB
0F79:20 20 20 A7 1F 20 20 20 08
0F81:20 9C A5 20 20 20 20 20 6F
0F89:20 C9 0D 12 C8 20 20 20 14
0F91:20 20 20 A7 1F AF AF AF 0D
0F99:AF 9C A5 20 20 20 20 A0 CF
0FA1:20 C9 0D 12 C8 20 20 20 2C
0FA9:20 20 20 20 20 20 20 20 C7
0FB1:20 20 20 20 20 20 20 C9 79
0FB9:0D 12 C8 20 20 20 20 20 DF
0FC1:20 20 20 20 20 20 20 DF
0FC9:20 20 20 20 C9 0D 12 5A
0FD1:C8 20 20 20 20 20 55 53 E1
0FD9:45 20 4A 4F 59 32 20 20 D4
0FE1:20 20 20 C9 0D 12 C6 C3 BA
0FE9:C3 C3 C3 C3 C3 C3 C3 08
0FF1:C3 C3 C3 C3 C3 C3 C3 10
0FF9:C3 C7 00 13 11 11 11 1D
1001:11 11 11 11 11 11 9A 0D 30
1009:12 A3 A3 A3 A3 A3 A3 A3 60
1011:A3 A3 A3 A3 A3 A3 A3 31
1019:A3 0D 12 20 20 20 20 20 74
1021:20 20 42 59 20 20 20 20 19
1029:20 20 20 0D 12 20 20 20 A7
1031:20 20 20 20 20 20 20 20 51
1039:20 20 20 20 20 0D 12 20 F0
1041:52 4F 42 45 52 54 20 42 61
1049:DC 20 43 4F 4F 4B A0 0D 33
1051:12 20 20 20 20 20 20 20 6A
1059:20 20 20 20 20 20 20 20 79
1061:20 0D 12 20 20 20 20 20 FA
1069:20 20 20 20 20 20 20 20 89
1071:20 20 20 0D 12 20 20 20 EF
1079:20 20 20 20 20 20 20 20 99
1081:20 20 20 20 20 0D 12 20 39
1089:20 20 20 20 20 20 20 20 A9
1091:20 20 20 20 20 20 20 00 91
1099:00 10 18 20 28 30 38 40 75
10A1:00 28 23 1E 19 14 0F 0A 53
10A9:26 25 24 14 12 02 01 00 86
10B1:5C 5C 5E 5F 21 23 24 25 DB
10B9:26 27 28 29 2A 2B 2C 2D D1
10C1:2E 2F 00 00 00 00 00 00 C4
10C9:00 00 00 00 00 00 00 00 E9
10D1:01 01 F0 01 41 11 F1 AA BD
10D9:A8 00 95 6C 00 95 BC 00 97
10E1:95 60 00 95 58 00 95 56 82
10E9:00 99 55 80 AE 55 60 BF 6E
10F1:95 B0 F3 E6 F0 C0 FB C0 39
10F9:00 3F 00 00 0C 00 00 00 4A
1101:00 00 00 00 00 00 00 00 23
1109:00 00 00 00 00 00 00 00 2B
1111:00 00 00 00 00 00 00 FF 33
1119:83 19 01 19 19 19 FF FF 22
1121:03 19 03 19 19 03 FF FF D1
1129:83 19 1F 1F 19 83 FF FF FF
1131:07 13 19 19 13 07 FF FF 05
1139:01 1F 07 1F 1F 01 FF FF 73
1141:01 1F 07 1F 1F 1F FF FF F3
1149:83 1F 11 19 19 83 FF FF 7F
1151:19 19 01 19 19 19 FF FF 25
1159:83 C7 C7 C7 C7 83 FF FF F0
1161:C1 E3 E3 E3 23 87 FF FF 4F
1169:13 07 0F 07 13 01 FF FF 26
1171:1F 1F 1F 1F 1F 01 FF FF BD
1179:39 11 01 01 29 39 FF FF DA
1181:19 09 01 11 19 19 FF FF D0
1189:83 19 19 19 19 83 FF FF 3F
1191:03 19 19 03 1F 1F FF FF 44
1199:83 19 19 19 83 F1 FF FF 5C

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11A1:03 19 19 03 11 19 FF FF CB
11A9:81 1F 83 F1 11 83 FF FF 7A
11B1:01 C7 C7 C7 C7 C7 FF FF 19
11B9:19 19 19 19 19 83 FF FF 3A
11C1:19 19 19 19 83 C7 FF FF A6
11C9:1C 1C 14 00 08 1C FF FF 34
11D1:39 11 83 83 11 39 FF FF EA
11D9:19 19 83 C7 C7 C7 FF FF 19
11E1:01 E3 C7 8F 1F 01 FF FF 6C
11E9:C3 CF CF CF CF C3 FF FF 66
11F1:00 00 00 00 00 00 FF 14
11F9:C3 F3 F3 F3 F3 C3 FF 67
1201:01 07 01 01 01 01 07 00 B1
1209:C0 C0 C0 C0 C0 F0 FF CC
1211:FF FF FF FF FF FF FF 35
1219:03 06 00 01 03 07 07 99 2C
1221:99 99 FF FF FF FF FF 78
1229:E0 70 E0 C0 80 00 F0 00 E7
1231:03 06 00 00 06 06 03 00 A6
1239:E0 70 E0 70 70 70 E0 00 14
1241:01 03 06 0C 1F 00 00 21
1249:E0 E0 E0 E0 F0 E0 00 0D
1251:07 07 07 00 06 06 03 00 E9
1259:F0 00 E0 70 70 70 E0 00 28
1261:03 07 07 06 06 06 03 00 58
1269:E0 00 E0 70 70 70 E0 00 28
1271:07 06 00 01 01 01 01 00 B8
1279:F0 70 E0 C0 80 80 80 00 61
1281:03 06 03 06 06 06 03 00 B7
1289:E0 70 E0 70 70 70 E0 FF 64
1291:83 19 19 19 19 83 FF FF 49
1299:C7 07 C7 C7 C7 01 FF FF 1B
12A1:83 31 E3 8F 1F 01 FF FF 46
12A9:83 31 E3 F1 31 83 FF FF 0F
12B1:E1 C1 91 00 F1 F1 FF FF C0
12B9:01 1F 03 F1 31 83 FF FF 3D
12C1:83 1F 03 19 19 83 FF FF 38
12C9:01 31 E3 C7 C7 C7 FF FF 11
12D1:83 19 83 19 19 83 FF FF D6
12D9:83 31 31 81 F1 83 FF FF E7
12E1:FF E7 FF FF E7 FF FF 3F
12E9:07 0C 00 00 01 00 01 00 9E
12F1:E0 30 60 C0 80 00 80 00 AF
12F9:0F 0F 0F 00 00 00 00 4B
1301:E0 E0 E0 20 20 70 F8 00 A2
1309:09 07 0F 0E 0F 07 09 00 E4
1311:90 E0 F0 76 F0 E0 90 00 69
1319:7F 7F 7F 7F 7F 7F 00 BF
1321:FE FE FE FE FE FE FE 48
1329:FF FF FF 00 FF 00 FF 4F
1331:80 BF A0 A7 A7 A7 A7 FF 41
1339:01 FD 05 E5 E5 E5 E5 A7 98
1341:A7 A7 A7 A0 BF 80 FF E5 0A
1349:E5 E5 E5 05 FD 01 FF A7 84
1351:A7 A7 A7 A7 A7 A7 E5 B5
1359:E5 E5 E5 E5 E5 E5 E5 99
1361:00 FF 00 FF FF FF FF 87
1369:FF FF FF 00 FF 00 FF 8F
1371:C6 EE FE FE D6 C6 00 00 58
1379:7C 38 38 38 38 38 7C 00 12
1381:E6 E6 F6 FE EE E6 E6 00 84
1389:FE E0 E0 E0 F8 E0 E0 00 9E
1391:7C EE E0 E0 7C 00 E0 00 14
1399:C6 C6 D6 D6 D6 FE FE 00 CD
13A1:FE E0 E0 E0 E0 F8 E0 00 56
13A9:FC E6 E6 E6 FC E0 E0 00 80
13B1:FE E0 E0 F8 E0 E0 FE 00 C3
13B9:FC E6 E6 FC EE E6 00 E6 BE
13C1:00 00 00 FF FF FF FF E0 C8
13C9:FE 00 00 00 FF FF FF 0E 7D

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13D1:EE 7C 00 00 00 FF FF FE 8D
13D9:EE C6 C6 00 00 00 FF E0 E2
13E1:E0 FE 00 00 00 FF FF E0 19
13E9:00 00 00 FF FF FF FF 10
13F1:FF FF FF FF E7 E7 FF 00 F6
13F9:F3 C3 00 00 00 00 00 0B

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TURBODOS

By Hong H. Pham

The 1541 disk drive is a remarkable device. It's very reliable, it has a wealth of DOS commands, and it easily handles sequential and relative files. The only downside of the 1541 is its notoriously slow speed. The 1571 is significantly faster when used with a 128 in 128 mode, but it's just as slow as the 1541 when used with a 64.

TurboDOS can change all that so you'll no longer have to wait very long to load or save large programs. TurboDOS commands speed loading, saving, and verifying up to seven times faster than DOS commands. In addition, TurboDOS breaks the track-35 barrier, allowing you to use all 40 tracks on a standard 5¹/₄-inch double density disk. With five more tracks available, you'll have another 85 blocks at your disposal, a total disk capacity of 749 blocks.

Getting Started

TurboDOS is written entirely in machine language. Enter it with MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When prompted for the starting and ending addresses, respond with the following values.

Starting address: 0801

Ending address: 2238

Before exiting MLX, be sure to save a copy of TurboDOS.

To run TurboDOS, load and run it like a BASIC program. TurboDOS installs itself and then displays a startup message. Note that the bottom of BASIC RAM is raised to \$2B01 (11009) to provide a protected area for TurboDOS to reside.

New Commands

In addition to speeding up disk access times, TurboDOS adds 17 new com-

mands to BASIC. This makes disk accessing more convenient. For most TurboDOS commands, it's not necessary to give the device parameter. If no device number is specified, TurboDOS will assume that you are using drive 8. If you are using LOAD, SAVE, or VERIFY commands in immediate mode, you can omit the device parameter following the filename. To use TurboDOS commands in a BASIC program, they must be preceded with a slash (/).

Because TurboDOS completely reprograms the disk drive, 6 of the 17 new commands will not work on disk drives which aren't 1541 compatible. Those 6 commands are BLOCK, DIR, FORMAT, LOCK, RENAME, and START. If you try to use the above commands on a non-1541-compatible disk drive, TurboDOS will report a *DEVICE NOT SUPPORTED* error message.

Seventeen Commands

Here are the new commands that you can use with TurboDOS.

DIR "string", device

DIR displays the disk directory on the screen. Entering DIR by itself will display the entire directory. You can specify which files to display with the string parameter. Wildcards are allowed.

BLOAD "filename", device, starting address

BLOAD loads a binary file and puts it at a specified location. If you don't specify the starting address, BLOAD will use the location specified by the file.

BSAVE "filename", device, starting address, ending address

Use BSAVE to save a file to a device from a specified memory location.

RESAVE "filename", device

When updating a BASIC program, you will have to scratch it before you can re-save it. RESAVE does all this in one step by scratching the file first and then saving it.

FORMAT "ID", "disk name", device

Because normal DOS cannot format tracks beyond 35, TurboDOS also is a custom disk formatter. A disk will format in about ten seconds. Use any two

ASCII characters for the ID and up to 16 characters for the disk name.

BLOCK mode, track, sector, buffer, ID flag, device

BLOCK is like DOS's B-R or B-W commands. To read a sector, set mode to 0. To write, set mode to 1. Buffer indicates which location TurboDOS should put the sector to or which location to get data from when performing a read or write operation.

Because TurboDOS cannot tell if a new disk has been placed into the drive, an *ID MISMATCH* error message may appear when you use this command. If a new disk has been placed into the drive, set the ID flag parameter to 1. Set it to 0 for any other consecutive read or write attempts to the same disk. It isn't always best to set the ID flag to 1 for all read or write attempts. TurboDOS will take an extra second to identify the disk, and the extra seconds will add up.

You can omit the ID parameter, and it will have the same effect as setting ID to 0. For example, to read track 18, sector 0 and then put the sector's contents at location \$4000 (16384), type in *BLOCK 0,18,0,16384,1*. To write this sector to track 35, sector 16, type in *BLOCK 1,35,16,16384*.

DISK "command string", device

DISK sends a disk command or displays the drive status. If entered by itself, the drive status will be displayed.

SCRATCH "filename", device

SCRATCH erases a file or multiple files from the disk directory. When using a TurboDOS formatted disk, you should use this command instead of the familiar S0: from DOS.

COLLECT device

COLLECT is much like DOS's V0 command. It validates the disk, updates the BAM, and deletes any splat files from the directory.

RENAME "old name" TO "new name", device

Use RENAME to change the name of a file on the disk directory.

LOCK "filename", mode, device

A locked file cannot be scratched. To

lock a file, set mode to 0. Using wildcards, you can lock just one file or the entire directory.

LOCK can also unlock files. Set mode to 1 to unlock. If you omit the mode parameter, TurboDOS will assume that you want to lock a file.

START "filename", device, new load address

START displays a program's load address or changes it. If you wish to see the program's load address only, omit the last parameter.

TRACK highest track, directory track

You can set the highest track that TurboDOS will use or which track the directory is on by using TRACK. If entered by itself, the highest track and the directory track will be displayed.

If the head chatters when approaching track 40 on your disk drive, you should lower the highest track number to 39 or 38.

SKEW sector interleave, directory sector interleave

Files will load faster if they are saved at an optimum sector interleave. TurboDOS saves files at a 1 : 7 sector interleave, and it also saves the directory at a 1 : 7 sector interleave. However, some other fastloaders will work faster if you change the sector interleave value to 1 : 6.

DEFAULT device

TurboDOS usually defaults to drive 8 when no device number is specified, but you can change the default device with this command.

COLOR border, background, cursor

COLOR is used to set the border, background, and cursor color to your own preference. Use the Commodore color numbers 0-15.

KILL

KILL disables TurboDOS, and it restores the former load, save, and BASIC vectors.

Odds and Ends

When using TurboDOS commands which require a filename, such as LOAD, SAVE, LOCK, and SCRATCH, you should not specify the drive num-

ber. For example, you should not type *LOAD "0:*.8"*. Instead, you should just simply type *LOAD ".*"*. TurboDOS will literally look for a file whose name is actually 0:*, and you will get a *FILE NOT FOUND* error message.

If you are using wildcards with TurboDOS, you cannot specify the file type. For example, *DIR "*"=S* will not display all sequential files on disk.

Although TurboDOS can access tracks 35 and beyond, it will not check for illegal tracks, tracks higher than 40. If TurboDOS encounters such errors, it will noisily slam the head against the headstop trying to look for a track that doesn't exist. If this happens, type *OPEN 15,8,15,"IO"*, and this will usually get your drive back in working order.

When scratching or collecting a TurboDOS formatted disk, you should use TurboDOS's SCRATCH or COLLECT command, rather than DOS's. Normal DOS will not scratch files or validate your disk properly if there are files saved beyond track 35. Although TurboDOS has its own disk-format routine to provide you with optimum storage space, this doesn't mean that you'll have to set aside several disks for exclusive TurboDOS use. TurboDOS can distinguish between regular format or TurboDOS format by looking at the third byte on track 18, sector 0, and it will act accordingly.

TURBODOS

```
0801:0B 08 70 17 9E 32 34 30 6E
0809:37 00 00 00 20 20 20 96
0811:20 20 20 20 20 A0 C4 B9 06
0819:3C 08 99 F8 00 B9 FD 08 F6
0821:99 33 03 88 D0 F1 A0 09 4C
0829:B9 0C 08 99 FF 03 88 D0 A1
0831:F7 A9 FD 85 2D A9 28 85 A5
0839:2E 4C 00 01 1B E6 03 FD FB
0841:28 AD 20 B9 6E 09 99 E8 24
0849:07 C8 D0 F7 EE 02 01 EE 19
0851:05 01 C6 F9 D0 ED A2 03 23
0859:20 34 03 F0 33 C9 07 D0 95
0861:16 A2 01 20 34 03 D0 0A A0
0869:A2 04 20 34 03 18 69 07 65
0871:10 05 A2 0A 20 34 03 85 1D
0879:A8 A5 A7 85 A9 A5 FE 85 FB
0881:F7 A5 FF 85 F8 20 6C 03 73
0889:A5 F8 85 FF A5 F7 85 FE 72
0891:E8 20 34 03 D0 1E A2 08 21
0899:20 34 03 A0 02 84 A8 85 2A
08A1:A6 18 A5 FC 65 A6 85 F7 58
08A9:A5 FD 65 A7 85 F8 20 6C EF
08B1:03 4C 13 01 E8 20 34 03 FB
08B9:D0 1C A0 03 84 A8 E8 20 36
08C1:34 03 F0 08 A2 08 20 34 F4
08C9:03 4C 5C 01 A2 0C 20 34 C3
```



```

08D1:03 E6 A7 4C 5C 01 E8 20 AF 0B01:2D A2 00 7C 40 1A 82 70 FD 0D31:BF 0E 0E BA 14 A8 1A 4C DF
08D9:34 03 D0 0A E8 20 34 03 B2 0B09:BC 02 29 08 C9 88 1C A2 EE 0D39:A3 0C 96 1F E0 01 A8 34 7D
08E1:18 69 04 A8 D0 D6 E8 20 37 0B11:42 86 90 38 B0 D8 E6 AE E4 0D41:CA 24 E8 C3 2C F6 0E 90 0D
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PROGRAMS

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1651:A2	13	AA	38	2E	DD	2E	A7	59	1881:03	4C	83	1C	69	92	01	0B	1B	1AB1:0D	4F	52	59	0E	1A	4F	4E	E5
1659:1A	2E	A8	1A	02	4F	35	BD	4A	1889:D4	A0	D4	00	85	B9	97	05	2E	1AB9:20	F0	76	43	20	00	6B	AE	C3
1661:A6	1A	F7	2F	E8	E0	03	90	BA	1891:24	D5	3B	87	19	36	02	87	56	1AC1:68	00	6D	A0	F0	40	01	27	93
1669:F5	EE	B4	AD	A9	1A	CD	7C	8B	1899:58	A1	14	84	41	28	85	29	08	1AC9:D0	48	0D	68	36	00	23	01	99
1671:1A	90	00	70	23	A2	1A	A9	57	18A1:67	9F	C3	85	C4	A9	28	A6	02	1AD1:98	E6	A5	0F	20	CE	16	75	8F
1679:A0	9D	4D	CA	10	FA	30	71	F1	18A9:C3	A4	C4	C5	C5	DC	72	A4	05	1AD9:1C	A2	40	6A	A3	80	03	0C	A4
1681:BB	99	90	29	20	5F	0B	04	2F	18B1:A1	6F	43	AE	10	29	2C	45	A4	1AE1:5A	D0	F0	79	00	C9	A4	34	D1
1689:C4	B7	8F	A6	09	02	A2	21	19	18B9:46	41	F3	F6	88	20	44	45	DD	1AE9:A2	0B	6C	32	1D	C3	E0	99	36
1691:00	63	A3	21	32	8D	A5	29	59	18C1:56	49	43	45	20	4E	55	4D	5E	1AF1:A6	1A	C8	C5	DF	F6	A4	B7	51
1699:A9	41	8D	A6	29	60	30	5E	90	18C9:42	E5	A2	60	19	1A	0A	F0	25	1AF9:8C	B2	20	73	00	CB	0E	01	A8
16A1:57	20	73	40	10	45	46	01	17	18D1:51	24	C6	81	BD	FF	A2	D6	AE	1B01:B0	9E	0C	D0	03	20	CD	20	1A
16A9:4D	2D	52	02	80	01	00	80	BA	18D9:B1	25	81	0A	20	06	94	00	3F	1B09:2F	99	38	24	B6	94	6E	65	D0
16B1:20	A0	40	C0	60	E0	10	90	61	18E1:B4	84	90	06	AE	04	22	4C	16	1B11:7C	94	4A	12	20	A5	BB	3C	60
16B9:30	B0	50	D0	70	F0	FE	FD	84	18E9:EC	E1	4C	E9	1E	F7	00	0C	0E	1B19:05	BC	48	A5	B7	48	A9	A6	3D
16C1:FB	F7	EF	DF	BF	7F	01	02	E5	18F1:A6	2D	A4	2E	A9	2B	20	D8	4B	1B21:A2	84	1B	BB	86	BC	AD	B6	22
16C9:18	E1	0B	10	20	40	80	04	E3	18F9:FF	E2	AE	4C	F9	E0	C1	D9	2E	1B29:1A	70	AE	7A	1A	A0	01	91	EC
16D1:08	0C	10	14	18	1C	20	24	DD	1901:2C	A9	01	85	A0	E8	1C	4C	59	1B31:1A	CF	D1	20	D3	20	A0	02	07
16D9:28	2C	30	34	38	3C	40	44	E5	1909:6F	E1	9A	5A	0B	1C	B7	42	DE	1B39:B1	AE	08	20	DC	20	85	1C	85
16E1:48	4C	50	54	58	5C	60	64	ED	1911:78	00	5C	46	FA	11	54	C0	F4	1B41:E2	20	86	A8	4F	22	A9	1B	BD
16E9:68	6C	70	74	78	7C	80	84	F5	1919:02	18	53	39	1A	1B	39	30	30	1B49:18	65	AE	C6	90	E7	AE	00	A8
16F1:88	8C	AC	B0	B4	B8	BC	29	51	1921:5E	60	7D	34	25	61	E2	71	73	1B51:29	F0	06	AC	01	29	4C	5D	86
16F9:B4	F0	6B	11	12	13	15	04	46	1929:72	1D	AE	7E	80	2F	41	E1	BE	1B59:20	68	68	68	92	8E	2C	A9	1E
1701:12	28	00	07	07	CB	71	8F	8C	1931:91	20	49	4E	5A	45	52	4C	EA	1B61:63	20	D1	0A	C8	91	85	B7	7B
1709:0B	44	9F	05	53	45	51	50	B4	1939:45	41	56	45	3A	20	20	31	41	1B69:80	08	BC	68	85	BB	A0	00	5C
1711:52	47	55	53	52	52	45	4C	CC	1941:3A	00	4A	9D	4B	86	0A	B0	EC	1B71:B1	BB	08	67	D8	F0	0D	C4	50
1719:E5	B4	06	09	0C	F6	10	E2	F7	1949:0A	32	52	E0	4A	30	4C	00	11	1B79:B7	90	F3	A9	A0	91	AE	C8	3A
1721:71	50	C7	40	46	00	00	20	6B	1951:4F	84	AE	85	AF	48	84	70	92	1B81:C0	10	D0	F9	E8	82	05	5A	8B
1729:41	00	0A	5A	1B	20	1D	08	7A	1959:F1	0A	D0	24	23	13	38	54	8D	1B89:8F	1C	4C	BB	10	AD	04	22	35
1731:A9	01	A2	2B	85	2B	86	2C	8D	1961:D0	02	18	24	90	10	98	82	3A	1B91:85	C5	0B	A0	66	63	A4	A2	14
1739:30	3F	5D	2B	20	44	E5	4C	D7	1969:D0	8D	03	F3	29	70	A4	83	DE	1B99:29	4A	86	AF	60	18	A5	AE	20
1741:37	C0	58	AA	9E	67	22	20	E7	1971:78	4C	C6	14	B0	8D	C2	A3	F1	1BA1:69	05	85	AE	30	EE	F4	2D	BD
1749:07	0C	EC	56	31	2E	30	31	D4	1979:AE	99	00	29	C8	D0	F8	A5	1D	1BA9:05	97	52	B0	99	33	02	12	4D
1751:20	0E	2A	2A	0D	1E	40	14	70	1981:0F	E2	80	20	A5	D0	A6	1C	D0	1BB1:8E	9B	24	00	DC	54	14	87	82
1759:88	50	59	52	B0	AE	54	20	39	1989:B9	D5	54	73	10	A8	00	C7	36	1BB9:45	42	11	20	F1	B7	86	BA	7D
1761:31	39	39	33	20	42	59	20	AD	1991:30	8D	E0	00	8C	09	8D	BD	23	1BC1:20	C3	21	B0	07	C9	59	0F	49
1769:43	4F	4D	A1	39	54	45	20	96	1999:F4	20	54	10	06	D8	51	08	18	1BC9:9B	45	50	3F	0F	A1	B8	62	EF
1771:50	55	42	4C	49	43	41	54	58	19A1:1C	45	10	41	E0	20	20	59	6A	1BD1:26	AE	AE	86	1A	AC	87	1A	B1
1779:49	4F	4E	53	0D	81	F4	81	F8	19A9:4F	55	20	53	55	52	45	3F	CF	1BD9:B6	81	10	5F	03	01	24	0F	37
1781:8C	8D	20	32	82	A5	2B	A4	26	19B1:20	00	20	CF	FF	C9	0D	F0	27	1BE1:10	11	A5	14	8D	2E	B8	A5	96
1789:2C	20	08	A4	20	30	E4	20	CC	19B9:06	8D	68	2F	4C	2F	1E	AD	5B	1BE9:15	8D	8C	9D	00	D0	F8	0D	BB
1791:96	E5	7C	A0	AD	25	1C	8D	E5	19C1:80	1A	C9	59	10	CE	56	AD	B7	1BF1:20	92	17	0D	50	52	4F	47	42
1799:A2	AD	22	19	8D	A2	AD	22	CE	19C9:AE	1A	AE	AF	1A	38	20	1E	BA	1BF9:1E	B7	4D	20	A6	70	10	20	10
17A1:1A	8D	A2	AD	22	17	8D	A2	9A	19D1:19	1C	3F	06	CB	1D	60	CE	42	1C01:41	44	44	C0	5F	53	11	80	6A
17A9:60	A9	AC	62	09	C5	8E	04	2F	19D9:6E	8E	84	13	06	BB	18	0D	05	1C09:5F	20	24	00	9B	C8	28	AD	7B
17B1:58	A9	8A	A2	58	45	8E	0E	F4	19E1:09	78	CE	8A	F0	03	A9	31	51	1C11:10	05	20	EF	21	A9	2F	20	C3
17B9:60	AD	23	86	15	08	48	24	CD	19E9:2C	A9	30	1B	4E	A9	56	58	72	1C19:96	AE	02	29	AD	03	29	20	07
17C1:1C	8D	09	01	16	8F	48	00	12	19F1:E9	15	68	19	A3	A7	13	84	63	1C21:CD	BD	4C	5B	18	20	E4	74	6E
17C9:03	AD	90	1B	8D	01	01	70	8B	19F9:5B	FC	00	60	A9	02	9E	DF	91	1C29:2E	D9	21	20	57	80	4C	43	AD
17D1:03	60	08	E0	40	F0	55	80	99	1A01:A9	0F	A6	BA	A8	20	BA	FF	89	1C31:0C	D4	A9	33	4C	95	85	4B	1C
17D9:C6	22	16	2E	8A	24	4C	74	8B	1A09:3C	3C	B0	90	20</													

PROGRAMS

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1C81:20 CC FF A9 0F 4C C3 FF C8
1C89:20 B0 0D 90 05 68 68 4C 8F
1C91:41 1C 60 48 28 C2 FF 0D 5B
1C99:20 FA 21 68 29 0F F8 18 DA
1CA1:69 90 69 40 D8 4C D2 FF 81
1CA9:08 2C 5E 9F 52 00 20 03 8C
1CB1:38 95 10 01 93 D9 80 01 83
1CB9:18 94 00 44 49 41 15 38 19
1CC1:43 91 15 54 43 48 0B CA 04
1CC9:4C 45 43 53 42 90 90 81 0E
1CD1:4D 41 3D 06 52 45 4E 41 8E
1CD9:4D 45 00 96 41 55 4C E4 50
1CE1:15 53 4B 45 57 00 54 52 EC
1CE9:41 C2 09 4C 4F 43 4B 00 77
1CF1:53 54 41 1A 4E FE AD 52 CE
1CF9:54 00 4B 49 4C 4C 00 D6 C4
1D01:00 43 4F 4C B0 00 00 D0 11
1D09:F5 13 1A 1D 08 1D 1D 1D 24
1D11:61 1C 94 1C 7D 21 17 1F 15
1D19:CB 1E 54 1E 87 1D F9 1D EE
1D21:CB 1F B4 1C 27 1D 33 1F 94
1D29:A2 1F 20 7C F7 20 46 1C 31
1D31:25 1C E4 20 80 F0 84 0A 7E
1D39:0F 82 0D 81 AA AA AA A5 50
1D41:22 D0 0E AF C0 85 00 58 91
1D49:A5 00 30 FC 24 20 70 FC AB
1D51:78 A9 00 85 30 8D 95 6E DB
1D59:F0 06 02 85 31 36 32 A9 96
1D61:28 8D 9C 24 04 8D 9D 01 7B
1D69:A9 10 85 21 85 44 81 F1 71
1D71:3B 85 2D 12 17 0D 0E 01 7B
1D79:2C A2 30 85 23 30 1E CA B1
1D81:D0 F6 88 D0 F3 C6 21 D0 CD
1D89:EF E4 44 F0 EB 86 EB ED CB
1D91:28 04 04 93 F3 03 93 B8 A8
1D99:03 4C 9B 59 2A A0 00 C8 0E
1DA1:78 F4 42 18 C9 FF D0 C0 CF
1DA9:20 88 0A AA BD 93 90 05 64
1DB1:86 03 BD 94 03 8D 87 C0 0F
1DB9:CD FF FF 28 8A E8 4C 2A 18
1DC1:03 9F 03 EC 03 19 04 DE F7
1DC9:05 F0 05 35 E7 56 81 01 53
1DD1:9F B1 03 2C 4C 5A C0 14 CC
1DD9:85 45 97 01 1D C6 45 D0 8A
1DE1:98 4F 43 20 A5 16 85 12 49
1DE9:A5 17 85 13 0A EF A5 12 0C
1DF1:A8 B6 03 13 47 23 48 98 AF
1DF9:91 3A 8C 68 9B 62 10 CD F7
1E01:DA C9 CB 03 62 B9 B0 10 32
1E09:20 CF 03 62 EF 06 D0 EC F5
1E11:60 09 F0 7E 02 02 88 1B 0A
1E19:02 26 8D 02 91 DE C1 01 3E
1E21:AC 01 71 06 20 93 D3 A0 1A
1E29:06 4C B6 06 A9 12 1D F8 7B
1E31:62 06 A3 3B 11 3A BA 63 92
1E39:A1 A8 85 44 B7 54 44 22 3F
1E41:A2 04 DD 2C 07 CA B0 FA 0E
1E49:55 5C 7C E0 31 07 9A 60 20
1E51:68 3E 87 21 9E CF 81 21 AC
1E59:67 28 44 C9 9A EF 73 44 08
1E61:98 CF B1 F0 60 A2 E2 A2 19
1E69:FF 48 33 B7 21 20 5D 04 E1
1E71:68 61 89 A1 10 88 53 80 70
1E79:66 B8 81 20 11 6B 81 2D EF
1E81:E0 03 13 78 68 80 49 39 E9
1E89:06 A5 80 85 06 A5 81 85 E9
1E91:07 4C 9F 04 AC DE C6 6A 6E
1E99:30 3B 24 2C 30 27 24 2D 97
1EA1:30 23 20 AF E9 7C 1E 49 84
1EA9:A6 C5 12 D0 11 A5 17 C5 0D

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1EB1:13 D0 0B A5 18 85 22 9D 20
1EB9:1B 2D 4C 54 2A FF 85 6A 64
1EC1:A9 09 60 A6 6A F0 10 1D DF
1EC9:17 28 04 12 44 04 40 E6 D6
1ED1:80 14 0E 02 4C 84 04 A0 52
1ED9:01 2C A0 03 4C 87 04 72 E0
1EE1:F9 7F 1D 03 B0 3F 40 55 27
1EE9:3A E5 34 D4 71 18 F4 A0 07
1EF1:BA 9C E3 00 01 5C 20 20 09
1EF9:E0 F8 C0 21 AE 00 02 AC 35
1F01:01 02 86 06 84 07 C5 3A 77
1F09:D0 0A A9 EC 37 5D B8 08 DE
1F11:CC 78 03 14 3F A5 06 85 97
1F19:18 A5 07 85 19 E1 69 C5 EE
1F21:73 C0 5A CA F0 E4 A9 93 43
1F29:E4 A3 13 D9 24 00 D0 ED 73
1F31:2F 08 D0 F0 91 39 D0 35 7A
1F39:FB 10 0D 2C F1 2D 30 F6 79
1F41:11 47 B8 18 A0 00 60 38 70
1F49:A9 01 60 C5 17 83 0E 17 FE
1F51:8B 05 B0 28 5C 88 C9 52 1A
1F59:D0 F1 85 24 9B AD AD 11 6F
1F61:99 25 00 C8 C0 54 F8 20 AB
1F69:97 F4 20 A6 05 C5 1A D0 63
1F71:02 18 60 60 39 38 84 D8 55
1F79:82 E4 C6 45 B1 F6 2C 4B 6C
1F81:88 50 9C 95 53 00 07 20 E5
1F89:71 81 7A 29 10 59 16 06 DA
1F91:A2 FF 86 6A 4C 6E 41 F0 28
1F99:33 28 07 20 2C 04 F9 54 18
1FA1:04 05 85 6A 20 5F 05 90 93
1FA9:09 20 C1 04 4E AE 45 10 B4
1FB1:F2 A2 09 D7 72 CC FF 8C 04
1FB9:03 1C AD 6B 00 F1 09 C0 87
1FC1:14 20 18 45 C1 E4 50 FE AA
1FC9:20 00 FE 4C A0 C1 89 32 0E
1FD1:CA 82 09 F9 1C 09 04 CD B1
1FD9:2C 09 F0 11 68 2B A0 AA 7B
1FE1:B0 1C 83 CA 30 F5 60 4E 05
1FE9:82 8C 0D 06 07 85 07 60 4B
1FF1:24 6A 30 03 A9 00 2C 09 C1
1FF9:F0 E7 04 22 20 59 04 A5 61
2001:19 4C F7 06 1A 54 E0 02 26
2009:2C 10 D0 10 4A 4A 40 0D 87
2011:48 39 AA A5 21 5B 0E AA B0
2019:BD 1D 07 AE 4A D0 FB 40 19
2021:09 68 F7 14 0A 34 B4 70 3B
2029:50 D8 CA 4A 0A 10 F0 80 B8
2031:20 F1 06 68 A0 FF D0 BE AA
2039:3C 15 4C 1A 2F A2 60 52 E2
2041:20 17 07 20 66 01 A2 99 50
2049:8E 94 01 60 68 B9 32 C0 6B
2051:0F 07 0D 05 0B 03 09 01 44
2059:0E 06 0C 04 0A 02 08 00 4C
2061:29 1F 19 12 DB 2F 82 60 43
2069:68 68 20 74 06 A9 06 E1 08
2071:0C 20 F5 30 80 26 5E 01 DB
2079:A9 03 8D B0 16 4C 46 01 7B
2081:78 A9 7A 8D 02 18 C4 77 02
2089:20 A3 40 FD 20 64 01 EE 2E
2091:54 01 AD 96 01 C9 F4 F3 68
2099:4C 26 19 C8 00 69 48 0A 79
20A1:84 30 2B D0 F9 24 80 DA DE
20A9:21 48 68 EB A1 08 0A 0A A3
20B1:85 21 AD 50 03 0A EA 72 40
20B9:2D 16 01 8E 69 29 0F 05 42
20C1:21 41 07 03 71 CC 60 20 93
20C9:9A 01 D0 3E A2 06 98 9B 8F
20D1:CC 98 EE A5 01 31 03 F4 9E
20D9:A2 B1 9A 48 05 FC 4C 4B AF

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20E1:EB A9 00 65 0D 20 EC 85 21
20E9:18 85 1E AD 35 85 16 85 A7
20F1:12 AD A3 91 21 17 85 13 B7
20F9:CC 86 30 8A CB 2C 06 C4 D0
2101:FA 42 56 32 28 EA A2 BB 2D
2109:BD 0B 9D 15 24 E8 D0 F7 50
2111:E6 31 20 E9 F5 85 3A 20 10
2119:8F F7 E6 C2 20 21 04 A5 5D
2121:22 C9 12 D0 09 A9 05 C8 F7
2129:4F 8B 28 38 85 9B 03 86 A5
2131:CE 57 32 80 58 84 19 A1 A7
2139:23 84 1F A5 16 45 17 45 A5
2141:18 45 19 85 1A 20 34 F9 10
2149:E8 38 A4 1F B5 24 99 6A 70
2151:C8 22 39 08 02 E6 19 A5 AB
2159:19 C5 43 C6 CC A0 00 F4 4C
2161:02 14 05 0B C0 C4 A2 08 61
2169:A4 21 E9 B2 02 E3 92 F1 65
2171:F3 84 21 61 36 50 BD 04 7B
2179:06 D1 D9 0C EC D8 14 6A 8C
2181:05 12 B8 D1 1C CA D0 FA A7
2189:A0 BB B4 0B B9 00 95 09 54
2191:28 F4 E4 3C B1 30 54 0D 89
2199:C8 D0 F5 9D BD 01 06 50 5B
21A1:FE B8 8D 01 1C E8 E0 07 A0
21A9:D0 F2 9D 73 C2 A9 01 8D 48
21B1:D6 03 C6 19 D0 8C 20 00 83
21B9:FE A5 18 C9 28 F0 05 E6 7A
21C1:18 4C 45 03 7C C1 AF F7 3E
21C9:E4 70 08 E5 A0 18 60 48 68
21D1:A2 01 C5 22 F0 34 E5 22 C6
21D9:10 04 49 FF A2 FF 0A A8 20
21E1:A9 A0 85 45 8A 18 6D 0D 86
21E9:E0 0D 03 85 1F BA 96 FC A6
21F1:05 1F 3C 97 A5 45 C9 90 E5
21F9:F0 02 C6 45 8D 8A 0B 2C 3B
2201:05 18 30 FB 88 D0 DA 68 39
2209:85 22 A2 00 A0 11 C9 24 ED
2211:B0 04 20 4B F2 A8 84 43 ED
2219:AD D0 E0 0F 29 9F 1D 82 F9
2221:04 8D 00 80 13 EE 8D 0C 4E
2229:1C A9 06 85 31 60 00 20 2A
2231:40 60 30 00 00 00 00 00 B3

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Hong H. Pham, 17, says he didn't want to shell out \$60 for a speed-load cartridge, so he wrote TurboDOS instead. He enjoys Tae Kwon Do and table tennis in Antigonish, Nova Scotia, Canada.

INSTANT ART

By Larry Cotton

Instant Art for the 64 creates fascinating multicolor high-resolution pictures based on a branch of mathematics known as linear cellular automata. The hypnotic patterns and colors can be varied almost endlessly and then saved to disk for a future "slide show."

Typing It In

Instant Art and its companion program, IA Slide Show, are both written in BASIC with machine language loaders.

To save you some typing, be aware that both programs share the same DATA statements. To help avoid typing errors, enter the programs with The Automatic Proofreader; see "Typing Aids" elsewhere in this section.

Begin by typing in the DATA statements in lines 10-180. Save them to disk with the filename DATA. Continue typing in Instant Art, and then save the entire program to disk with the filename INSTANT ART.

To begin entering IA Slide Show, first load DATA with the .8 extension. Then, continue entering lines 190-310 of the listing. Save IA Slide Show to disk with that name.

Creating Art

After you've finished typing and saving, load and run Instant Art. Read the menu while the machine language portion loads. To create your first picture, press the up-arrow (↑) key. This switches the program from the text (menu) screen to the hi-res screen, where pictures are created. Then press Return to create a picture. Pressing Return generates a new random-pattern picture in a few seconds.

Color Control

All menu options are available from the hi-res screen. Pictures have the potential of being displayed in up to 3 of the 64's 16 available colors. Only the first picture created after the program is run exhibits randomly generated colors. Each succeeding new picture is drawn in the same three colors as the previous one. You can change the colors with the function keys. Color can often greatly enhance what may otherwise be a so-so creation. Each function key cycles certain portions of the pictures in the same particular 16-color order. If you want to return to a particular color, just keep pressing the appropriate function key.

Variants and Automatic Mode

Pressing V creates a variant of the existing picture in the same four colors. Often even a seemingly dull picture can be transformed into a work of art by pressing V. When you get tired of the manual mode, press A. Then sit back and watch the pictures appear in automatic mode.

Saving and Loading

You can save and load pictures from disk by pressing S or L, respectively. Unlike normal hi-res screens, each of these consumes only one or two blocks of disk space. Naturally, any picture must be loaded using the exact name under which it was saved. If you want to view all of your creations sequentially, you must save them with consecutive filenames starting with A 1, A 2, A 3, and so on. Be sure to leave a space between the A and the number!

Other Menu Options

Pressing P dumps your creation (unfortunately, in black-and-white) to any Epson-compatible printer. Simpler patterns create more interesting printouts. Printouts work fine with my Star NX-1000 printer and Xetec Super Graphic interface.

If a picture evolving onscreen seems dull, you can stop it at any point by pressing any menu key—Return or V are good choices. If you press a key not mentioned in the menu, the picture stops, and the program returns to the menu. Press Q to end the program.

IA Slide Show

As mentioned above, you can sequentially view your masterpieces with IA Slide Show. You must have saved some screens as A 1, A 2, and so on from Instant Art. Load IA Slide Show now and run it. At the prompt, enter the number of screens that you want to see and press Return. Then sit back and enjoy a beautiful show! Press the Run/Stop-Restore combination to end the program.

INSTANT ART

```
PK 5 REM COPYRIGHT 1993 - COMP
    UTE PUBLICATIONS INTL LTD
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GM 10 DATA160,32,132,251,132,2
    53,160,1,132,252,136,132
    ,250,162,199,134,166,162
    ,39
QB 20 DATA134,167,132,169,177,
    250,133,168,165,167,240,
    4,160,8,177,250,10,38,16
    8,42
XX 30 DATA38,168,42,41,3,133,1
    70,160,4,169,0,38,168,42
    ,38,168,42,72,101,170,10
    1
BA 40 DATA169,170,165,170,133,
```

```
169,104,133,170,189,0,23
    ,6,254,6,254,5,254,133,2
    54
XK 50 DATA136,208,221,145,252,
    24,198,167,16,40,162,2,1
    81,250,41,7,201,7,240,15
    ,56
BB 60 DATA181,250,233,55,149,2
    50,181,251,233,1,149,251
    ,208,6,246,250,208,2,246
    ,251
AQ 70 DATA202,202,240,223,198,
    166,208,144,96,162,2,181
    ,250,105,8,149,250,144,3
    ,246
PQ 80 DATA251,24,202,202,240,2
    41,76,172,23,27,65,8,13,
    10,27,75,64,1,0,165,197,
    201
HC 90 DATA64,208,219,76,35,23,
    160,32,132,251,160,0,132
    ,250,160,25,132,252,160,
    0
MM 100 DATA185,162,23,32,210,2
    55,200,192,9,208,245,16
    0,40,132,253,160,7,177,
    250
HH 110 DATA162,7,42,118,166,20
    2,16,250,136,16,243,169
    ,7,170,56,101,250,133,2
    50,144
DX 120 DATA2,230,251,181,166,3
    2,210,255,202,16,248,19
    8,253,208,217,198,252,2
    08,196
GG 130 DATA96,173,58,3,160,0,1
    53,0,4,153,251,4,153,24
    5,5,153,239,6,200,192,2
    51,208
QR 140 DATA239,96,173,59,3,160
    ,0,153,0,216,153,251,21
    6,153,245,217,153,239,2
    18,200
QR 150 DATA192,251,208,239,96,
    169,8,13,24,208,141,24,
    208,169,32,13,17,208,14
    1,17
XR 160 DATA208,169,63,133,216,
    169,0,133,215,168,145,2
    15,160,63,162,32,145,21
    5,136
SD 170 DATA208,251,198,216,202
    ,208,246,169,4,133,232,
    169,0,133,231,168,173,5
    2,3
JG 180 DATA162,4,145,231,200,2
    08,251,230,232,202,208,
    246,96
CG 190 CH=INT(154*RND(1))+1:CO
    =INT(16*RND(1))+0:G=INT
    (16*RND(1))+0:W=8192:X=
    8504
AK 200 V=53265:GOSUB600:R=RND(
    -TI):FE=255
KA 210 S=5900:FORI=STOS+241:RE
    ADA:POKEI,A:NEXT
XE 220 T=828:FORI=TTOT+45:READ
```


PROGRAMS

```

A:POKEI,A:NEXT
KC 230 GETCS:IFCS="THEN230
CJ 240 I=ABS(ASC(C$)-132):IFI<
5THENONIGOSUB410,410,44
0,460:GOTO230
DC 250 IFC$=CHR$(13)THENGOSUB3
40:GOTO230
PK 260 IFC$="A"THENGOSUB580:GO
SUB760:GOTO230
HC 270 IFC$="L"THENGOSUB480:GO
SUB520:GOTO230
HH 280 IFC$="P"THENGOSUB790:GO
TO230
DH 290 IFC$="Q"THENCLOSE4:SYS8
32
PR 300 IFC$="S"THENGOSUB480:GO
SUB490:GOTO230
QB 310 IFC$="V"THENGOSUB580:GO
SUB360:GOTO230
SA 320 IFC$="↑"THENGOSUB580:GO
TO230
DH 330 GOSUB480:GOSUB600:GOTO2
30
SP 340 GOSUB580:Q$="":Z$="":FO
RL=1TO10:Z$=RIGHT$(STR$
(INT(RND(1)*4)),1)
DK 350 Q$=Q$+Z$:NEXT
HC 360 GOSUB550:Q=4*RND(1)+1:O
NQGOTO370,380,390,400
MD 370 Y=FE*RND(1)+1:FORI=WT0X
STEP8:POKEI,Y:NEXT:SYSS
:RETURN
QJ 380 Q=RND(1)*5:FORI=1TOQ:PO
KE8184+8*(INT(RND(1)*40
)),RND(1)*FE:NEXT:SYSS:
RETURN
PP 390 FORI=WT0XSTEP8:POKEI,FE
*NND(1):NEXT:SYSS:RETUR
N
MP 400 FORI=WT0XSTEP8:POKEI,0:
NEXT:POKE8352,FE*RND(1)
:SYSS:RETURN
JQ 410 IFI=1THENC1=C1+1:IFC1=1
6THENC1=0
EC 420 IFI=2THENC2=C2+1:IFC2=1
6THENC2=0
FM 430 CH=C1*16+C2:GOSUB580:RE
TURN
FS 440 CO=CO+1:IFCO=16THENCO=0
MS 450 GOSUB580:RETURN
RG 460 G=G+1:IFG=16THENG=0
CQ 470 GOSUB580:RETURN
RP 480 POKEV,27:POKEV+5,200:PO
KEV+7,21:POKEV+15,15:PO
KEV+16,1:POKE646,6:RETU
RN
AA 490 F$="":PRINT"{CLR}":INPU
T"{9 DOWN}"2 SPACES}PAT
TERN TO SAVE";F$:IFF$="
"THEN560
FF 500 OPEN3,8,1,F$:FORI=WT0XS
TEP8:PRINT#3,PEEK(I):NE
XT:PRINT#3,CH:PRINT#3,C
O
DD 510 PRINT#3,G:PRINT#3,QS:CL
OSE3:PRINT"{CLR}":GOSUB
580:RETURN
QE 520 F$="":PRINT"{CLR}":INPU
T"{9 DOWN}"2 SPACES}PAT
TERN TO LOAD";F$:IFF$="
"THEN560
RB 530 OPEN3,8,0,F$:FORI=WT0XS
TEP8:INPUT#3,J:POKEI,J:
NEXT:INPUT#3,CH:INPUT#3
,CO
SG 540 INPUT#3,G:INPUT#3,Q$:GO
SUB550:GOTO560
KM 550 A=5887:FORI=1TO10:POKEA
+I,VAL(MID$(Q$,I,1)):NE
XT:RETURN
JK 560 CLOSE3:GOSUB580:IFF$="
"THENRETURN
FD 570 SYSS:RETURN
GM 580 POKE826,CH:SYST:POKE827
,CO:SYSS51:POKEV+15,G:P
OKEV+16,G:POKEV,59
PG 590 POKEV+5,216:POKEV+7,24:
RETURN
ER 600 POKEV+15,15:POKEV+16,1:
PRINTCHR$(142)"{CLR}
{3 DOWN}"{CYN}"TAB(7)"IN
STANT ART INSTRUCTIONS
PRINT"{BLK}"TAB(7)"
{24 T}
SK 620 PRINT"{RED}"TAB(7)"F1 -
CYCLE COLOR 1
PQ 630 PRINTTAB(7)"F3 - CYCLE
{SPACE}COLOR 2
MB 640 PRINTTAB(7)"F5 - CYCLE
{SPACE}COLOR 3
RG 650 PRINTTAB(7)"F7 - CYCLE
{SPACE}COLOR 4 & BORDER
GK 660 PRINT"{DOWN}"{BLU}"TAB(7
)"↑ - HI-RES SCREEN
EB 670 PRINTTAB(7)"V - VARIANT
MQ 680 PRINTTAB(7)"A - AUTOMAT
IC
SA 690 PRINTTAB(7)"P - PRINT
GX 700 PRINTTAB(7)"S - SAVE
AE 710 PRINTTAB(7)"L - LOAD
HC 720 PRINTTAB(7)"Q - QUIT
JC 730 PRINT"{DOWN}"{GRN}"TAB(7
)"RETURN - NEW SCREEN
RF 740 PRINT"{DOWN}"{CYN}"TAB(7
)"OTHER KEYS RETURN TO
{SPACE}MENU
DH 750 PRINT"{BLK}"TAB(7)"
{25 T}":RETURN
QB 760 ONRND(1)*3+1GOSUB410,44
0,460:GOSUB340
RR 770 IFPEEK(198)THENRETURN
KK 780 GOTO760
SK 790 GOSUB480:PRINT"{CLR}
{10 DOWN}"TAB(7)"MAKE S
URE PRINTER IS READY
KF 800 PRINT"{DOWN}"TAB(9)"AND
PRESS ANY KEY. . .
MF 810 GETRS:IFRS="THEN810
HR 820 PRINT"{DOWN}"TAB(13)"PR
INTING. . .":A$=CHR$(10
):OPEN4,4,5:CMD4:SYS606
9
MP 830 PRINT:PRINT:PRINT:CLOSE
4:GOSUB580:RETURN
XB 840 C=INT(16*RND(1))+0:PRIN
TC:GOTO840

```

IA SLIDE SHOW

```

PK 5 REM COPYRIGHT 1993 - COMP
UTE PUBLICATIONS INTL LTD
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GM 10 DATA160,32,132,251,132,2
53,160,1,132,252,136,132
,250,162,199,134,166,162
,39
QB 20 DATA134,167,132,169,177,
250,133,168,165,167,240,
4,160,8,177,250,10,38,16
8,42
XX 30 DATA38,168,42,41,3,133,1
70,160,4,169,0,38,168,42
,38,168,42,72,101,170,10
1
BA 40 DATA169,170,165,170,133,
169,104,133,170,189,0,23
,6,254,6,254,5,254,133,2
54
XK 50 DATA136,208,221,145,252,
24,198,167,16,40,162,2,1
81,250,41,7,201,7,240,15
,56
BB 60 DATA181,250,233,55,149,2
50,181,251,233,1,149,251
,208,6,246,250,208,2,246
,251
AQ 70 DATA202,202,240,223,198,
166,208,144,96,162,2,181
,250,105,8,149,250,144,3
,246
PQ 80 DATA251,24,202,202,240,2
41,76,172,23,27,65,8,13,
10,27,75,64,1,0,165,197,
201
HC 90 DATA64,208,219,76,35,23,
160,32,132,251,160,0,132
,250,160,25,132,252,160,
0
MM 100 DATA185,162,23,32,210,2
55,200,192,9,208,245,16
0,40,132,253,160,7,177,
250
HH 110 DATA162,7,42,118,166,20
2,16,250,136,16,243,169
,7,170,56,101,250,133,2
50,144
DX 120 DATA2,230,251,181,166,3
2,210,255,202,16,248,19
8,253,208,217,198,252,2
08,196
GG 130 DATA96,173,58,3,160,0,1
53,0,4,153,251,4,153,24
5,5,153,239,6,200,192,2
51,208
QR 140 DATA239,96,173,59,3,160
,0,153,0,216,153,251,21
6,153,245,217,153,239,2
18,200
QR 150 DATA192,251,208,239,96,
169,8,13,24,208,141,24,
208,169,32,13,17,208,14
1,17

```



```

XR 160 DATA208,169,63,133,216,
      169,0,133,215,168,145,2
      15,160,63,162,32,145,21
      5,136
SD 170 DATA208,251,198,216,202
      208,246,169,4,133,232,
      169,0,133,231,168,173,5
      2,3
JG 180 DATA162,4,145,231,200,2
      08,251,230,232,202,208,
      246,96
EH 190 W=8192:E=8:V=53265:POKE
      V+15,6:DIMJ(39)
PD 200 PRINT"CLR":WHT
      {3 DOWN}"TAB(10)"PLEASE
      WAIT 3 SEC.
KA 210 S=5900:FORI=STOS+241:RE
      ADA:POKEI,A:NEXT
XE 220 T=828:FORI=TTOT+45:READ
      A:POKEI,A:NEXT
MR 230 U=36906:FORI=UTOU+65:RE
      ADA:POKEI,A:NEXT
JG 240 PRINT"DOWN":TAB(10):;I
      NPUT"NO. OF SLIDES";NS:
      SYSU
SX 250 POKEV,59:POKEV+5,216:PO
      KEV+7,24
PG 260 FORN=1TONS:OPEN3,8,0,"A
      "+STR$(N)
FX 270 FORI=0TO39:INPUT#3,J(I)
      :NEXT:INPUT#3,CH:INPUT#
      3,CO:INPUT#3,G
RG 280 INPUT#3,Q$:CLOSE3:SYSU:
      POKE826,CH:SYST:POKE827
      ,CO:SYS851
DR 290 POKEV+15,G:POKEV+16,G:F
      ORI=1TO10:POKE5887+I,VA
      L(MID$(Q$,I,1)):NEXT
SM 300 FORI=0TO39:POKEW+I*E,J(
      I):NEXT:SYSS:NEXT
MF 310 GOTO310

```

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NUMBER BASE CONVERSIONS

By Bruce M. Bowden

Make conversions quickly and easily between any two number bases with this interesting utility for the 64. Even fractions are converted! A printer is optional.

There are many ways of representing numbers such as one-to-one correspondences, additive groupings, and so on. But every system centers around some definite basis for counting. In everyday work, for example, the majority of the civilized world counts by 10s. A very reasonable suggestion has been made that we use a number system built of ten basic

symbols (0, 1, 2, 3, 4, 5, 6, 7, 8, and 9) because we have ten fingers.

In our system of numeration, which has a base of 10, any number that we wish to represent is written as a collection of multiples of powers of 10. For example, the number 324 may also be written as 4×10^0 (any number to the power of 0 is equal to 1) plus 2×10^1 (any number to the first power is just the number itself) plus 3×10^2 .

If there are digits to the right of the decimal point, they may also be represented as multiples of negative powers of 10. Hence, the fraction .175 may be written out as 1×10^{-1} , plus 7×10^{-2} , plus 5×10^{-3} . Combine these two numbers into one, and above each digit write the exponent of 10 that corresponds to each digit's multiplier to see the following pattern.

$$3^2 2^1 4^0 . 1^{-1} 7^{-2} 5^{-3}$$

So you see, there's a specific way in which our numbers are written—first grouped by powers of the base and then with symbols representing multipliers of those powers. There are as many symbols as are needed to fill the gaps between the powers of the number base.

The positional method outlined above is a standard of the modern world. Of course, the choice of 10 as a base is purely arbitrary. The Mesopotamians used the sexagesimal system (base 60); the Mayans used a vigesimal (base 20) system mixed with a secondary base 5. The Roman system of numeration is a combination of base 5 with base 10.

Sometimes, even now, practical need requires that we deviate from 10 as our base. In computing, the on-and-off state of electrical switches lends itself naturally to a binary (base 2) method of numeric representation. An example of this is the compact representation of binary numbers in bases which are powers of 2, such as the octal (base 8) and hexadecimal (base 16) numbers.

In any base system, however, the same positional notation is applied as detailed above. The binary number 11010, for example, can be read from the right as 0×2^0 plus 1×2^1 plus 0×2^2 plus 1×2^3 plus 1×2^4 .

Of course, for every base N in positional notation there must be N symbols. What happens when the base is larger than 10? In other words, what digit fol-

lows 9? Those familiar with hexadecimal numbers know that, by convention, the letters of the alphabet are used for these numbers.

Hexadecimal digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F. Extending this scheme, we can write numbers for any base ranging up to 36—at which point we reach the end of the alphabet, and no standard exists for continuation. Number Base Conversions will allow you to enter numbers from any base within the range of 2–36 and convert to any other base within the same range. Both the integer and fractional parts are converted for you.

Typing It In

Number Base Conversions is written entirely in BASIC. To avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. When you've finished, save the program before running it.

Getting Started

When the NBC title screen appears, press any key to get a brief description of what the program does. Press a key again, and you'll be prompted to enter a starting base. We'll start at base 10, so type in 10 and press Return. Next is a prompt for the ending base. Let's use base 2, so type 2 and press Return. A prompt appears asking for the number which is to be converted from base 10 to base 2. For this example, type 85. After a brief pause, you'll see that 85 in base 10 converted to base 2 is 1010101.

Options

Now that you've tried one conversion, you have a screen full of options to choose from by pressing the appropriate function key. By pressing f1, you can convert the same number in the same starting base you just used to a value in a different base. Let's do that.

Press f1, and you're prompted for the ending base. Type in 8 this time. The program does a quick calculation and reports that the decimal number 85 is 125 in octal, or base 8, notation.

There's every kind of option available from the function key menu. You can change the starting base, the ending base, and the number and ending base, or you can keep both the

PROGRAMS

source and target bases but change the number being converted. You may also send your results to a printer or begin again fresh.

Encryption

An interesting application of a base converter program like this is that since base 36 includes the entire alphabet, it's possible to encrypt messages.

Let's try an example by converting my name, Bruce Bowden. NBC prefers lowercase letters. Let's put a decimal between the names so the final result won't be too large. Let's enter *bruce.bowden* as a base 36 number, convert it to base 10, and then convert it to base 2. In base 10, the base 36 *bruce.bowden* that we enter becomes 19774814.324767927.

To further convert this base 10 number to base 2, press f5 and enter 2 at the prompt. NBC keeps track of the number so that we're not required to enter it manually. The conversion to binary produces 100101101101111010101110.010100110010001111111010101001. (Whew!)

You may find several useful applications for NBC, but it also has theoretical applications. Here are some questions you may want to investigate: If the prime factors of the number 10 are 2 and 5, the base 10 representation of $\frac{1}{10}$ is .2, and the base 10 representation of $\frac{1}{5}$ is .2, does a similar relationship exist between a base, its prime factors, and the reciprocals of the prime factors in other base systems?

Are there recognizable patterns in the fractional parts of numbers that suggest that they may be more simply represented in a different base system?

How might two or more base systems be combined to create ciphers that are difficult to crack? There are deeper questions that you may wish to ponder also, such as properties of numeric representation which are invariant over different bases. See what you can discover!

NUMBER BASE CONVERSIONS

```
MS 10 REM COPYRIGHT 1993 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
SP 20 PRINT "{CLR}{3 DOWN}{N}":
    POKE 53280,6:POKE 53281,
    5
```

```
PF 30 PRINT "{YEL}":MS$="NUMBER
    BASE CONVERSIONS":GOSUB
    960
KD 40 PRINT "{CYN}":MS$="BY BRU
    CE M. BOWDEN":GOSUB960:P
    RINT "{2 DOWN}{WHT}"
FA 50 MS$="COPYRIGHT, 1992":GO
    SUB960:MS$="COMPUTE PUBL
    ICATIONS INTL LTD":GOSUB
    960
GK 60 MS$="ALL RIGHTS RESERVED
    ":GOSUB 960:GOSUB980
ER 70 PRINT "{CLR}{4 DOWN}"
BR 80 MS$="BASECON WILL CONVER
    T NUMBERS FROM ANY":GOSU
    B960
AD 90 MS$="NUMBER BASE LESS TH
    AN OR EQUAL TO 36":GOSUB
    960
SE 100 MS$="TO ANOTHER BASE IN
    THE SAME RANGE":GOSUB9
    60
QB 110 GOSUB 980:IF S=0 THEN 2
    30
JG 120 PRINT "{CLR}{2 DOWN}SELE
    CT FROM ONE OF THESE FU
    NCTION KEYS:"
KP 130 PRINT "{2 DOWN}F1 ** USE
    THE SAME STARTING BASE
    AND {10 SPACES}NUMBER A
    S BEFORE"
EQ 140 PRINT "{DOWN}F3 ** USE J
    UST THE SAME STARTING B
    ASE"
SH 150 PRINT "{DOWN}F5 ** USE T
    HE ENDING BASE AS THE N
    EW {10 SPACES}BASE AND T
    HE SOLUTION"
RH 160 PRINT "{6 SPACES}AS THE
    {SPACE}NEW NUMBER"
GB 170 PRINT "{DOWN}F7 ** KEEP
    {SPACE}THE SAME STARTIN
    G AND ENDING"
DS 180 PRINT "{6 SPACES}BASES":
    PRINT "{DOWN}F2 ** SEND
    {SPACE}RESULTS TO PRINT
    ER"
DJ 190 PRINT "{DOWN}F4 ** EVERY
    THING FRESH"
QK 200 GETA$:IFA$="ORA$<{F1}
    "ORA$>{F4}"THEN200
SC 210 XX=ASC(A$)-132:ONXXGOTO
    370,300,860,440,890,220
GG 220 RUN230
JM 230 PRINT "{CLR}{2 DOWN}PLEA
    SE ENTER THE STARTING B
    ASE HERE:"
CK 240 PRINT "{2 DOWN}";TAB(12)
    :INPUTS:IFS=>2THEN260
HA 250 PRINTTAB(8);"{2 DOWN}";
    S;"IS LESS THAN 2."GOT
    0280
SM 260 IFS<36THEN290
EA 270 PRINTTAB(8);"{2 DOWN}";
    S;"IS GREATER THAN 36."
MD 280 PRINT "{2 SPACES}THE BAS
    E MUST BE BETWEEN 2 AND
```

```
36!":GOSUB 980:GOTO230
FM 290 S=INT(S)
HC 300 PRINT "{CLR}{2 DOWN}PLEA
    SE ENTER THE ENDING BAS
    E HERE:"
KR 310 PRINT "{2 DOWN}";TAB(12)
    :INPUTE:IFE=>2THEN330
PQ 320 PRINTTAB(8);"{2 DOWN}";
    E;"IS LESS THAN 2."GOT
    0350
CH 330 IFE<36THEN360
AC 340 PRINTTAB(8);"{2 DOWN}";
    E;"IS GREATER THAN 36."
GH 350 PRINT "{2 SPACES}THE BAS
    E MUST BE BETWEEN 2 AND
    36!":GOSUB 980:GOTO300
SG 360 E=INT(E):GOTO440
DH 370 PRINT "{CLR}{2 DOWN}PLEA
    SE ENTER THE ENDING BAS
    E HERE:"
QS 380 PRINT "{2 DOWN}";TAB(12)
    :INPUTE:IFE=>2THEN410
BB 390 PRINTTAB(8);"{2 DOWN}";
    E;"IS LESS THAN 2."
FJ 400 PRINT "{2 SPACES}THE BAS
    E MUST BE BETWEEN 2 AND
    36!":GOSUB 980:GOTO370
GM 410 IFE<36THEN430
DD 420 PRINTTAB(8);"{2 DOWN}";
    E;"IS GREATER THAN 36."
    :GOTO400
FS 430 E=INT(E):GOTO470
BH 440 PRINT "{CLR}{2 DOWN}"
QQ 450 PRINT "YOU MAY NOW ENTER
    THE NUMBER WHICH IS
    {3 SPACES}BEING CONVERT
    ED FROM BASE";S
BX 460 PRINT "TO BASE";E;"BELOW
    ":PRINT "{2 DOWN}";TAB(1
    2):INPUTNS
CJ 470 PRINT "{2 DOWN}
    {2 SPACES}PLEASE STANDB
    Y FOR COMPUTATION...":X
    =1
RR 480 IFMID$(N$,X,1)=". "THEN6
    90
PX 490 X=X+1:IFX<>LEN(N$)+1THE
    N480
RH 500 I$=N$:F$="0":V=0
DB 510 IFS=ETHEN820
KB 520 IFS<>10THEN560
HE 530 IFI$<>" "THEN550
FC 540 I$="0"
CK 550 T=VAL(I$):V=VAL("."+F$)
    :GOTO700
JX 560 T=0:FORX=LEN(I$)TO1STEP
    -1:D=ASC(MID$(I$,X,1)):
    IFD<48ORD>57THEN580
DM 570 T=T+(D-48)*S↑(LEN(I$)-X
    )
GC 580 IFD<65ORD>90THENNEXT:GO
    TO600
PR 590 T=T+(D-55)*S↑(LEN(I$)-X
    ):NEXT
GM 600 IFT<1E10THEN620
XS 610 PRINT "THIS NUMBER IS TO
    O LONG TO BE EVALUATED"
```



```

:GOTO110
GF 620 IFF$="0"THEN670
DF 630 V=0:FORX=1TOLEN(F$):D=A
SC(MID$(F$,X,1)):IFD<48
ORD>57THEN650
SQ 640 V=V+(D-48)/S↑X
ED 650 IFD<65ORD>90THENNEXT:GO
TO670
BR 660 V=V+(D-55)/S↑X:NEXT
GX 670 I$=STR$(T):F$=STR$(V):F
$=MID$(F$,2,LEN(F$)-1):
IFE=10THEN820
BS 680 GOTO700
QH 690 I$=MID$(N$,1,X-1):F$=MI
D$(N$,X+1,LEN(N$)-X):GO
TO510
SX 700 I$="":F$=""
CH 710 A=T/E:DP=INT(E*(A-INT(A
)))+.5):IFDP<0ORDP>9THEN
730
HD 720 I$=CHR$(DP+48)+I$:GOTO7
40
QE 730 I$=CHR$(DP+55)+I$
RQ 740 T=INT(A):IFT<>0THEN710
MS 750 X=1:A=V*E
MM 760 IFINT(A)<0ORINT(A)>9THE
N780
DM 770 F$=F$+MID$(STR$(INT(A))
,2,LEN(STR$(INT(A)))):G
OTO790
RK 780 F$=F$+CHR$(INT(A)+55)
HR 790 V=A-INT(A):IFV=0THEN820
AF 800 X=X+1:IFX<151THENA=V*E:
GOTO760
GR 810 F$=F$+"..."
GR 820 PRINT"{CLR}{2 DOWN}THE
{SPACE}BASE";S;"NUMBER
{SPACE}";N$;" IS"
BK 830 IF E=10 AND F$<>"0" THE
N PRINT"{2 DOWN}{RVS} "
;I$;F$;" {OFF}{2 DOWN}"
EJ 840 IF E<>10 OR F$="0" THEN
PRINT"{2 DOWN}{RVS} ";
I$;". ";F$;" {OFF}
{2 DOWN}"
HD 850 PRINT"WHEN EXPRESSED IN
BASE";E:GOTO110
QE 860 S=E:IF E=10 AND F$<>"0"
THEN N$=I$+F$
HH 870 IF E<>10 OR F$="0" THEN
N$=I$+"."+F$
JX 880 T=0:V=0:I$="":F$="":GOT
O370
QP 890 PRINT"{CLR}{2 DOWN}
{RVS}{7 SPACES}PRINTOUT
{SHIFT-SPACE}OF
{SHIFT-SPACE}THE
{SHIFT-SPACE}RESULTS
{10 SPACES}{OFF}"
XA 900 PRINT"{3 DOWN}"
SS 910 PRINT"BE SURE THAT THE
{SPACE}PRINTER IS SWITC
HED ON AND IS DEVICE #4
":GOSUB 980
MK 920 OPEN3,4,7:PRINT#3,"THE
{SPACE}BASE";S;"NUMBER
{SPACE}";N$;" IS"

```

```

JK 930 IF E=10 AND F$<>"0" THE
N PRINT#3,I$;F$
MF 940 IF E<>10 OR F$="0" THEN
PRINT#3,I$;". ";F$
DP 950 PRINT#3,"WHEN EXPRESSED
IN BASE";E:PRINT#3,:CL
OSE3:GOTO110
AS 960 REM MESSAGE CENTERING R
OUTINE
KB 970 FOR MX=1 TO 20-LEN(MS$)
/2:PRINTCHR$(32);:NEXT:
PRINTMS$:RETURN
XX 980 PRINT"(HOME){21 DOWN}
{YEL}"
JF 990 MS$="PRESS ANY KEY TO C
ONTINUE":GOSUB 960
GE 1000 GET AS:IF AS="" THEN 1
000
BX 1010 PRINT"{WHT}":RETURN

```

Bruce M. Bowden is a programmer at COMPUTE.

QUICKSCREEN

By Danny English

Say goodbye to boring titles, text screens, and menus. Quickscreen is a short machine language program that's easy to use and will add excitement to almost any 64 program. A simple SYS command can zoom text or character graphics on and off the screen at the touch of a key.

Getting Started

Quickscreen is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following addresses.

Starting address: C000
Ending address: C3B7

Be sure to save a copy of the program before you exit MLX. Load the program with the .8,1 extension, type *NEW*, and then use the SYS commands that are listed below.

Quick Demo is a demonstration program that will give you a better idea of what Quickscreen can do and how to use it in your own BASIC programs. It is written in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; again see "Typing Aids." Save the demo on the same disk that Quickscreen is on because the demo loads and runs the main program. The

demo also shows you how to load Quickscreen into your own BASIC programs as they run.

Using the Program

To use Quickscreen in your programs, refer to the table of commands printed below. As you start to program a title screen, for instance, first hide the screen with SYS 49152,7. This prevents any images from appearing on-screen until you're ready.

Next, create your title screen, menu, or text screen, using POKEs or PRINT statements as you normally would. Then store the screen to the Quickscreen buffer (SYS 49152,0). The next steps are to clear the screen and then to return the screen to normal with SYS 49152,8. Your screen is now ready to animate.

You have three methods (like those found in commercial programs) of scrolling text onto the screen. When it is time to clear the screen, a call to another command will scroll the screen out. Be aware that the buffer will be cleared as you clear the screen.

Ideas

As you use Quickscreen, you'll find dozens of other uses for it. In addition to giving your title screens a professional look, you can also use Quickscreen in adventure games to scroll text in and out. Creating a custom character slide show would be a cinch with Quickscreen. The commands that scroll the screen out can be used to clear any screen. You can also use Quickscreen commands in direct mode.

SYS Command	Function
SYS 49152,0	Store screen in buffer
SYS 49152,1	Scroll in 1
SYS 49152,2	Scroll out 1
SYS 49152,3	Scroll in 2
SYS 49152,4	Scroll out 2
SYS 49152,5	Scroll in 3
SYS 49152,6	Scroll out 3
SYS 49152,7	Hide screen
SYS 49152,8	Return screen

QUICKSCREEN

```

C000:20 9B B7 8A C9 00 F0 2D 75
C008:C9 01 F0 2C C9 02 F0 2B F2
C010:C9 03 F0 2A C9 04 F0 29 61

```


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```

C018:C9 05 F0 28 C9 06 F0 27 CF
C020:C9 07 F0 05 C9 08 F0 07 0E
C028:60 A9 00 8D 11 D0 60 A9 53
C030:1B 8D 11 D0 60 4C 48 C2 59
C038:4C BE 42 4C EA C2 4C F3 9B
C040:C2 4C 4A C3 4C 57 C3 4C 4F
C048:A7 C3 20 C2 C0 C0 00 F0 B8
C050:1E A5 F8 18 69 28 85 F8 DA
C058:A5 F9 69 00 85 F9 A5 FC B4
C060:18 69 28 85 FC A5 FD 69 89
C068:00 85 FD 88 4C 4D C0 E0 8D
C070:00 F0 1E A5 FA 18 69 28 7F
C078:85 FA A5 FB 69 00 85 FB 42
C080:A5 FE 18 69 28 85 FE A5 29
C088:FF 69 00 85 FF CA 4C 6F EF
C090:C0 A0 00 B1 FA 91 F8 B1 77
C098:FE 91 FC C8 C0 28 D0 F3 66
C0A0:60 A2 07 A0 98 84 F8 86 35
C0A8:F9 A2 07 A0 C0 84 FA 86 4F
C0B0:FB A2 DB A0 98 84 FC 86 B5
C0B8:FD A2 DB A0 C0 84 FE 86 04
C0C0:FF 60 A9 00 85 F8 85 FA A5
C0C8:85 FC A9 04 85 F9 A9 C8 F1
C0D0:85 FB A9 D8 85 FD A9 E8 37
C0D8:85 FE A9 CB 85 FF 60 20 DB
C0E0:A1 C0 A0 00 B1 F8 91 FA 07
C0E8:B1 FC 91 FE C8 C0 28 D0 0F
C0F0:F3 20 13 C2 A5 FB C9 04 B7
C0F8:D0 E8 A5 FA C9 00 D0 E2 54
C100:60 20 A1 C0 A0 00 B1 F8 5D
C108:91 FA B1 FC 91 FE C8 C0 F3
C110:28 D0 F3 20 13 C2 A5 FB 47
C118:C9 05 D0 E8 A5 FA C9 0E F7
C120:D0 E2 A2 04 A0 28 84 F8 01
C128:86 F9 A2 04 A0 00 84 FA 0B
C130:86 FB A2 D8 A0 28 84 FC 83
C138:86 FD A2 D8 A0 00 84 FE 6D
C140:86 FF A0 00 B1 F8 91 FA AA
C148:B1 FC 91 FE C8 C0 28 D0 70
C150:F3 20 DE C1 A5 FB C9 05 83
C158:D0 E8 A5 FA C9 B8 D0 E2 98
C160:60 A2 05 A0 90 84 F8 86 76
C168:F9 A2 05 A0 80 84 FA 86 90
C170:FB A2 D9 A0 90 84 FC 86 F6
C178:FD A2 D9 A0 B8 84 FE 86 45
C180:FF A0 00 B1 F8 91 FA B1 FC
C188:FC 91 FE C8 C0 28 D0 F3 97
C190:20 13 C2 A5 FB C9 04 D0 7B
C198:E8 A5 FA C9 00 D0 E2 A2 A1
C1A0:06 A0 30 84 F8 86 F8 A2 16
C1A8:06 A0 08 84 FA 86 FB A2 2D
C1B0:DA A0 30 84 FC 86 FD A2 B8
C1B8:DA A0 08 84 FE 86 FF A0 CD
C1C0:00 B1 F8 91 FA B1 FC 91 13
C1C8:FE C8 C0 28 D0 F3 20 DE 0E
C1D0:C1 A5 FB C9 07 D0 E8 A5 AD
C1D8:FA C9 C0 D0 E2 60 A5 F8 4E
C1E0:18 69 28 85 F8 A5 F9 69 E3
C1E8:00 85 F9 A5 FA 18 69 28 9A
C1F0:85 FA A5 FB 69 00 85 FB BC
C1F8:A5 FC 18 69 28 85 FC A5 1F
C200:FD 69 00 85 FD A5 FE 18 D3
C208:69 28 85 FE A5 FF 69 00 EC
C210:85 FF 60 A5 F8 38 E9 28 63
C218:85 F8 A5 F9 E9 00 85 F9 47
C220:A5 FA 38 E9 28 85 FA A5 CF
C228:FB E9 00 85 FB A5 FC 38 27
C230:E9 28 85 FC A5 FD E9 00 2E
C238:85 FD A5 FE 38 E9 28 85 E3
C240:FE A5 FF E9 00 85 FF 60 C3

```

```

C248:20 C2 C0 A0 00 B1 F8 91 FA
C250:FA B1 FC 91 FE A5 F8 18 11
C258:69 01 85 F8 A5 F9 69 00 FA
C260:85 F9 A5 FA 18 69 01 85 79
C268:FA A5 FB 69 00 85 FB A5 9E
C270:FC 18 69 01 85 FC A5 FD 21
C278:69 00 85 FD A5 FE 18 69 06
C280:01 85 FE A5 FF 69 00 85 4D
C288:FF A5 F9 C9 07 D0 BE A5 F1
C290:F8 C9 E8 D0 B8 60 A2 C8 84
C298:A0 00 86 FB 84 FA A0 00 50
C2A0:A9 20 91 FA A5 FA 18 69 97
C2A8:01 85 FA A5 FB 69 00 85 D4
C2B0:FB A5 FB C9 CB D0 E9 A5 D4
C2B8:FA C9 E8 D0 E3 60 A9 93 DF
C2C0:20 D2 FF A9 18 8D F1 CF 50
C2C8:A9 00 8D F2 CF AE F1 CF F0
C2D0:AC F2 CF 20 4A C0 20 DF DA
C2D8:C0 CE F1 CF AD F1 CF C9 4C
C2E0:00 D0 EA A2 00 A0 00 4C F0
C2E8:4A C0 20 96 C2 20 DF C0 48
C2F0:4C C3 C2 A9 93 20 D2 FF 43
C2F8:A2 00 A0 0B 8E F1 CF 8C FC
C300:F2 CF A2 18 A0 0D 8E F3 15
C308:CF 8C F4 CF AE F1 CF AC BF
C310:F2 CF 20 4A C0 AE F3 CF 26
C318:AC F4 CF 20 4A C0 20 01 C5
C320:C1 EE F1 CF CE F3 CF AD 13
C328:F1 CF C9 0B D0 DE A2 0D DA
C330:A0 0D 20 4A C0 A2 0C A0 3D
C338:0C 20 4A C0 A2 0A A0 0A AB
C340:20 4A C0 A2 0B A0 0B 4C E9
C348:4A C0 20 96 C2 A2 0C A0 EB
C350:0C 20 4A C0 4C 5C C3 A9 40
C358:93 20 D2 FF A2 0B A0 00 8E
C360:8E F1 CF 8C F2 CF A2 0D 97
C368:A0 18 8E F3 CF 8C F4 CF C1
C370:AE F1 CF AC F2 CF 20 4A F1
C378:C0 AE F3 CF AC F4 CF 20 80
C380:4A C0 20 61 C1 CE F1 CF 74
C388:EE F3 CF AD F1 CF C9 00 BB
C390:D0 DE A2 00 A0 00 20 4A 1C
C398:C0 A2 0C A0 0C 20 4A C0 EA
C3A0:A2 18 A0 18 4C 4A C0 20 42
C3A8:96 C2 A2 0C A0 0C 20 4A 01
C3B0:C0 4C F8 C2 00 00 00 00 F6

```

QUICK DEMO

```

PK 5 REM COPYRIGHT 1993 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
ES 10 IF PEEK(49152) <> 32 THE
N LOAD"QUICKSCREEN",8,1
AS 20 D$="{HOME}{24 DOWN}":A$=
*****{HOME}"
EG 30 POKE53280,0:POKE53281,0
DC 40 PRINT"{CLR}":FOR X=0 TO
{SPACE}250:NEXT X
KC 50 PRINT"{4 DOWN}{YEL}"SPC(
14)"{RVS}QUICKSCREEN!
{OFF}"
BK 60 PRINT"{2 DOWN}{CYN}
{5 SPACES}BORING TEXT DI
SPLAYS COME ALIVE!"
SA 70 PRINT"{DOWN}{3}
{5 SPACES}CHARACTER GRAP
HIC DISPLAYS ZOOM!"

```

```

MQ 80 PRINT"{3 DOWN}{WHT}"SPC(
14)"{RVS}SELECT DEMO:
{OFF}"
DJ 90 PRINT"{2 DOWN}{6}"SPC(5)
"1) DEMO # 1 {GRN}- SCRE
EN ROLL IN"
XE 100 PRINT"{DOWN}{6}"SPC(5)"
2) DEMO # 2 {GRN}- SCRE
EN SPLIT"
XM 110 PRINT"{DOWN}{6}"SPC(5)"
3) DEMO # 3 {GRN}- SCRE
EN MERGE"
PC 120 GET K$:IF K$="1"THEN 31
0
DP 130 IF K$="2"THEN 370
BF 140 IF K$="3"THEN 430
SP 150 GOTO120
MS 160 REM ** DRAW & STORE SCR
EEN **
AS 170 SYS 49152,7: REM *** SC
REEN OFF
MK 180 PRINT"{CYN}{CLR}"A$;D$;
A$
RA 190 FOR X=1024 TO 1984 STEP
40:POKE X,42:NEXT
QC 200 FOR X=1063 TO 2023 STEP
40:POKE X,42:NEXT
JH 210 PRINT"{HOME}{4 DOWN}"SP
C(12)"{3}{RVS}QUICKSCRE
EN DEMO"
HQ 220 PRINT"{2 DOWN}{WHT}"SPC
(6)"A QUICK SYS COMMAND
MOVES THE"
QC 230 PRINT"{2 DOWN}"SPC(12)"
SCREEN IN OR OUT."
JJ 240 PRINT"{4 DOWN}{YEL}
{4 RIGHT}CAN BE USED IN
BASIC OR MACHINE"
DS 250 PRINT"{2 DOWN}"SPC(12)"
LANGUAGE PROGRAMS."
RP 260 PRINT"{2 DOWN}{PUR}"SPC
(9)"{RVS}{DOWN} PRESS A
KEY CONTINUE {HOME}"
JH 270 SYS 49152,0: REM *** ST
ORE SCREEN
GB 280 PRINT"{CLR}":{4 SPACES}
REM *** CLEAR SCREEN
GG 290 SYS 49152,8: REM *** SC
REEN ON
HJ 300 RETURN
MX 310 REM ** DEMO # 1 **
GG 320 GOSUB 160: REM *** DRAW
& STORE SCR
PC 330 SYS 49152,1: REM *** MO
VE IN # 1
QR 340 GET K$:IFK$=""THEN 340
EJ 350 SYS 49152,2: REM *** MO
VE OUT # 1
DM 360 GOTO 40
FC 370 REM ** DEMO # 2 **
BM 380 GOSUB 160: REM *** DRAW
& STORE SCR
FM 390 SYS 49152,3: REM *** MO
VE IN # 2
SQ 400 GET K$:IFK$=""THEN 400
PD 410 SYS 49152,4: REM *** MO
VE OUT # 2

```



```

JS 420 GOTO 40
CG 430 REM ** DEMO # 3 **
GR 440 GOSUB 160: REM *** DRAW
      & STORE SCR
FF 450 SYS 49152,5: REM *** MO
      VE IN # 3
KB 460 GET K$:IFK$=""THEN 460
MP 470 SYS 49152,6: REM *** MO
      VE OUT # 3
BC 480 GOTO 40

```

Danny English is the author of *PowerSprite* (March 1993). He lives in Moreno Valley, California.

ALTKEY

By Ron Loughran

The programmable function keys on the 128 are a great convenience. I liked them so much I wanted more of them. AltKey is the result.

The program uses the 128's Alt (Alternate) key in combination with any alphanumeric key (A-Z and 0-9) or other unshifted key, such as the comma, period, or semicolon. With them you can print anything, up to 16 characters in length, that you've assigned to that key. A few keys cannot be programmed. These include the space, the back and up arrows, the At key (@), and the British pound key.

AltKey can be used to print commands in immediate mode, to construct a program line, or to help you while you're working with the 128's machine language monitor. When you call up a defined key, it's only necessary to press Return to execute any command or series of commands assigned to that key. AltKey works on the 128 in 40-column mode.

Typing It In

AltKey consists of three machine language programs that must be entered with MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. For the first program, when MLX prompts, respond with the following values.

Starting address: 0C00
Ending address: 0C8F

When you've finished typing, be sure to save the program to disk with the filename PREP before you exit MLX.

For the second program, Juker, when MLX prompts, respond with the values printed below.

Starting address: 1620
Ending address: 1677

When you've finished typing this program, save it to disk with the filename JUKER.ML.

For the third program, AltKey, when MLX prompts, respond with the values printed below.

Starting address: FA29
Ending address: FB00

When you've finished typing, be sure to save this program to disk with the filename ALTKEY.ML.

The first program, Prep, prepares the area of memory where the key data will be stored by filling it with zeros. It then identifies the memory used for each key, marks the keys that aren't available, and installs data that is used for saves. Prep's 140 bytes save you from entering more than 800 bytes.

Preparing Disks

When you first run AltKey, BLOAD all three programs and activate Prep by typing SYS 3072. Then put in a disk on which you want the finished AltKey program to reside. Type SYS 5725 to turn on AltKey. Enter the machine language monitor by pressing f8. If your function keys have been redefined, type MONITOR and press Return.

Move the cursor to a clear area of the screen at least five lines above the bottom, hold down the Alt key and simultaneously press the At key (@). Two lines will appear onscreen. Move the cursor down to the line that reads S"ALTKEY.ML" 8 FA29 FE2A and press Return. Move the cursor back to that same line and change it to read S"JUKER.ML" 8 1620 1674 and press Return.

This saves copies of AltKey and Juker to your work disk. Whenever you want to put AltKey on another disk, use this method, but don't use Prep. Prep will erase any key definitions that you may have entered.

Using AltKey

BLOAD both JUKER.ML and ALTKEY.ML and type SYS 5725 to start the program; SYS 5719 to exit.

To assign characters to a key, type the desired key at the left margin fol-

lowed immediately by up to 16 characters of whatever you want that key to type. Mark the end of your text with a back-arrow key (←). Then hold down the Alt key and simultaneously press the back-arrow key. For example, type in the following line with four spaces between the quotation marks. Remember to hold down the Alt key while pressing the second (←)key.

D?DEC(" ")←

This will define the D key to print code for converting a four-digit hexadecimal number into its decimal equivalent. Move the cursor anywhere on the screen, hold down the Alt key, and simultaneously press the D key. You should see the following line onscreen.

?DEC(" ")

Enter a hex address between the quotation marks—C000 for example—and then press Return. The 128 will print the decimal location, which in this example is 49152. You could have used the word PRINT instead of the question mark shorthand symbol, but it would have used more of your 16 characters.

What's Been Defined?

After you've defined a number of keys, it may be difficult to remember which keys do what. Hold down Alt and press the up-arrow key (↑) to see a list of all the available keys and their definitions.

To save your defined keys, enter the ML monitor and remember to scroll the screen so that the cursor is at least five lines above the bottom of the screen. Then use the At key (@) as above. You'll see @,S0:ALTKEY.ML on the screen. Then, without moving the cursor, press Return. After the SCRATCHED FILE message appears, press Return again to save the new version of AltKey. Then, whenever you load AltKey in the future, you'll have those defined keys ready for use.

Caveats

AltKey doesn't use the Kernal. It writes directly to the screen, so at times the first character will appear in reverse video. This is cosmetic only and doesn't affect anything. If whatever prints wraps

PROGRAMS

to the next line, that line will not be linked. Move the cursor until it wraps to a new line and then use AltKey.

PREP

```
0C00:A2 2A A9 FB 85 FC A9 00 5C
0C08:85 FB A0 00 A9 00 91 FB 62
0C10:C8 C0 0F D0 F9 8A 91 FB C4
0C18:18 A9 10 65 FB 85 FB 90 7D
0C20:02 E6 FC E8 E0 3C F0 18 13
0C28:E0 3E F0 14 E0 3F F0 10 95
0C30:E0 40 F0 08 E0 5B D0 D2 50
0C38:A9 67 D0 06 A9 80 D0 02 6C
0C40:A9 59 86 FA A0 00 AA BD 1C
0C48:00 0C 91 FB F0 04 C8 E8 67
0C50:D0 F5 A6 FA E0 5B D0 B6 9F
0C58:60 0E 0F 14 20 01 16 01 79
0C60:05 0C 01 02 0C 05 00 13 C7
0C68:22 01 0C 14 0B 05 19 2E 61
0C70:0D 0C 22 20 38 20 06 01 A7
0C78:32 39 20 06 05 32 39 00 BF
0C80:20 2C 13 30 3A 01 0C 14 1B
0C88:0B 05 19 2E 0D 0C 00 00 06
```

JUKER.ML

```
1620:E0 08 F0 03 4C AD C6 AA 5E
1628:8D 01 FF 4C 3D FA A0 FE 36
1630:84 FE A9 10 2C A9 20 85 62
1638:FD 60 A9 04 A2 00 85 FC 0E
1640:86 FB 60 A5 E0 85 FB A5 CF
1648:E1 85 FC A5 EC 18 65 FB 4F
1650:85 FB 90 02 E6 FC 60 A9 06
1658:C6 A0 AD D0 04 A9 16 A0 66
1660:20 A2 3C 78 9D 01 03 98 E3
1668:9D 00 03 58 60 20 DD 02 8A
1670:A8 91 E0 60 00 00 00 00 77
```

ALTKEY.ML

```
FA29:20 E5 FA 20 43 16 A0 00 BD
FA31:B1 FD F0 07 91 FB C8 C0 DC
FA39:10 D0 F5 60 E0 40 F0 0E 28
FA41:E0 5E F0 2A E0 5F F0 68 CE
FA49:20 29 FA 4C DD 02 20 43 38
FA51:16 A9 78 20 4D 16 20 2E FE
FA59:16 20 2F FA 98 20 4D 16 ED
FA61:20 35 16 20 2F FA A2 40 64
FA69:20 29 FA 4C 6D 16 20 3A 1C
FA71:16 A2 29 86 FA A0 00 E6 E9
FA79:FA A5 FA C9 5B F0 CC C9 54
FA81:40 F0 F2 90 02 E9 40 91 05
FA89:FB 20 AA FA A6 FA A9 02 01
FA91:20 4D 16 20 E5 FA 20 2F 3A
FA99:FA C0 12 B0 05 20 AB FA 85
FAA1:D0 F7 A9 12 20 4D 16 D0 87
FAA9:CC C8 A9 20 91 FB C8 60 DD
FAB1:A0 00 B1 E0 F0 95 C9 3E EB
FAB9:B0 91 C9 2A B0 06 C9 1B 94
FAC1:B0 89 69 40 20 E6 FA A5 DB
FAC9:FD D0 02 C6 FE C6 FD C8 77
FAD1:C0 11 F0 E0 B1 E0 C9 1F 5C
FAD9:F0 06 91 FD D0 F1 F0 D4 E0
FAE1:A9 00 F0 F6 8A 38 E9 2A 6D
FAE9:0A 0A 85 FD A9 00 85 FE 4F
FAF1:06 FD 26 FE 06 FD 26 FE 92
FAF9:A9 FB 65 FE 85 FE 60 00 49
```

Ron Loughran lives in Flemington, West Virginia. □

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and The Automatic Proofreader are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each Gazette Disk and are printed in all issues of Gazette through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free printed copies of both of these handy programs for you to type in. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope. Send a self-addressed disk mailer with appropriate postage to receive these programs on disk.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

ATTENTION WRITERS PROGRAMMERS

Gazette wants to purchase and publish your utilities, applications, games, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it and the documentation on disk to

Gazette Submissions Reviewer
COMPUTE Publications
324 W. Wendover, Ste. 200
Greensboro, NC 27408

Please enclose an SASE if you want to have your materials returned.

ONLY ON DISK

Here are bonus programs that you'll find only on this month's Gazette Disk.

Video Tape Supervisor

By Tom Rich
Austin, TX

Video Tape Supervisor is a great database program for the film buff who has a large video library. With VTS you can inventory and organize your videotapes. Use it to display movies alphabetically; by tape number; or by category, such as adventure, comedy, Western, drama, and so on. Create your own specialized film lists, locate the tape on which a film is recorded, and track data for up to 200 tapes and 450 movies.

Stock Holdings

By William F. Rose
Wantagh, NY

A few months ago Gazette called for useful applications to use with COMPUTE's SpeedCalc spreadsheet. Stock Holdings is a template that William Rose has used for more than five years to track his stock portfolio. Stock Holdings tracks the dollar value of each stock and calculates the total value of all holdings for each week during a year. The template can be easily edited to suit your own portfolio.

Screen Gems

Henning Vahlenkamp
Matawan, NJ

These graphical programs for the 128 appeared in a tutorial in last month's Gazette, but several readers asked to have these BASIC 7.0 gems on disk. Here they are for your convenience.

You can have these program and all the others that appear in this issue by ordering the June Gazette Disk. The price is \$9.95 plus \$2.00 shipping and handling. Send your order to Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.